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COMMERCIAL PRODUCT RUNDOWN

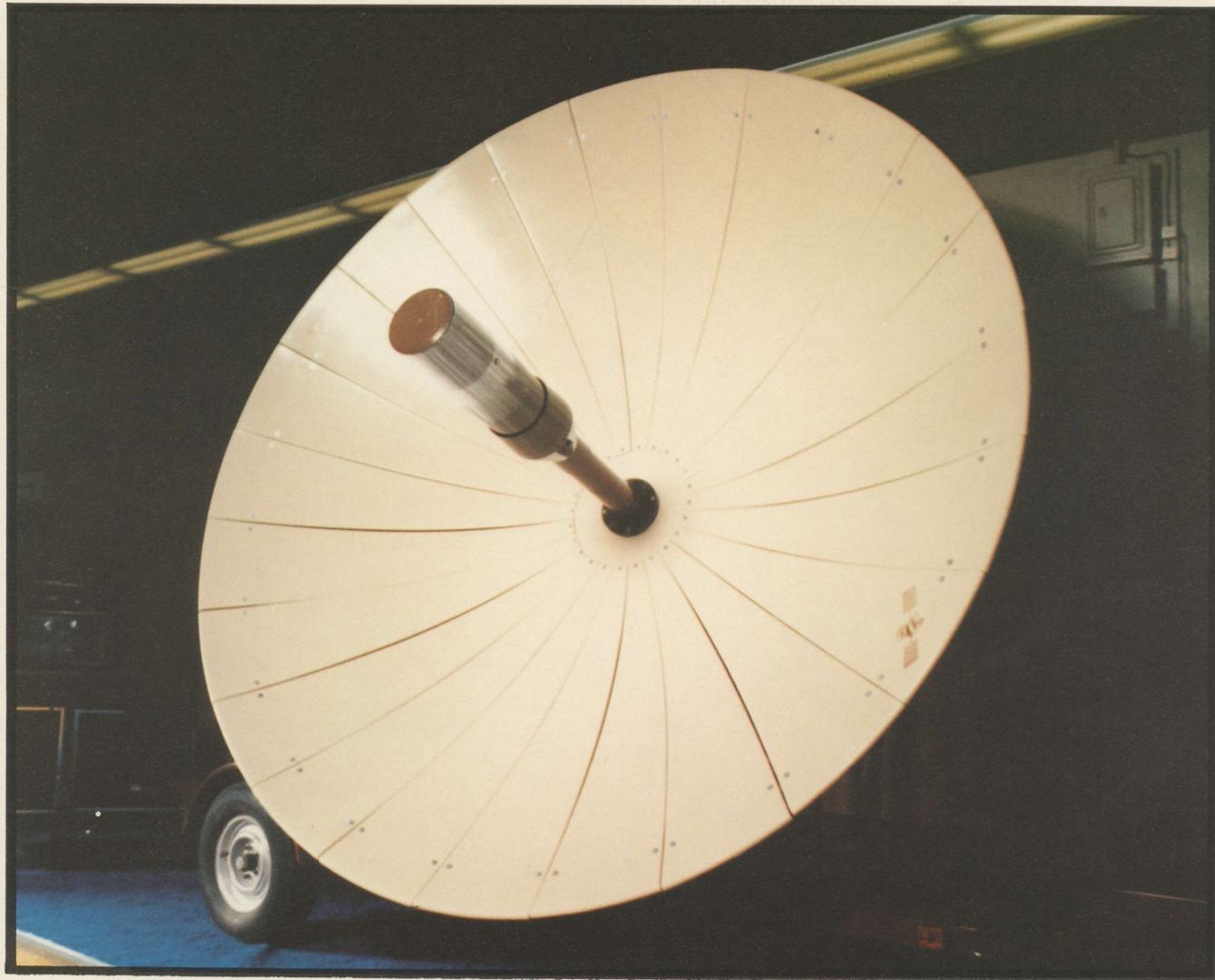
COOP'S
SATELLITE
DIGEST



AUGUST 1980



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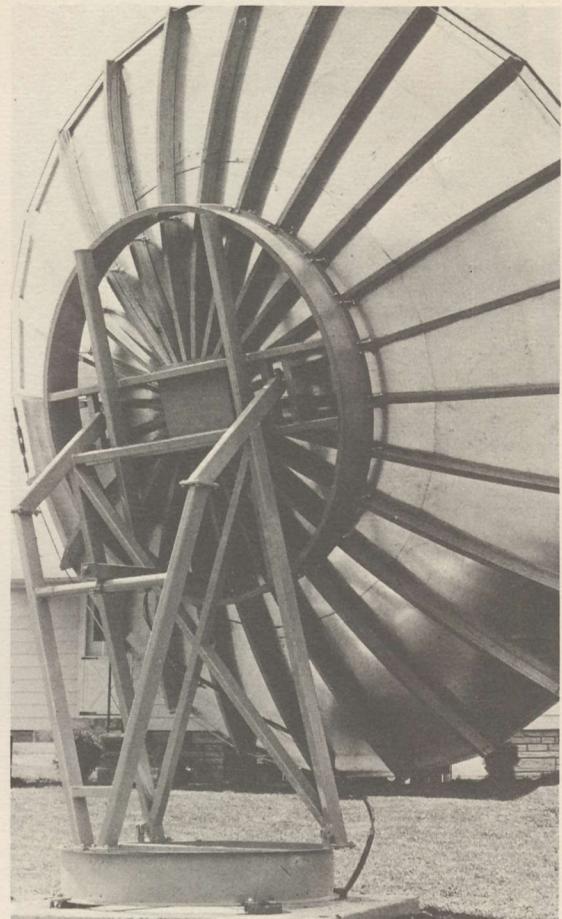
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COOP'S COMMENT ON TECHNOLOGY

AFTER SAN JOSE

Much of this issue of **CSD** reports on the events that shaped the San Jose SPTS. We all learned a great deal; far too much to relate in a single issue. Everything worked superbly with the possible exception of a minor San Jose (wide) power glitch Sunday morning that chopped us 'off-the-air' about five minutes into our every-morning 'Today At SPTS' live TV report. Pity. We had some great guests lined up!

This industry came of age in San Jose. The 32 booth displays showed surprising maturity and a handful even grew out of the 'table top display' era into self-contained booths. There were 22 operating TVRO antennas there; from the six foot '8 Ball Camper Special' to some very impressive motor driven 16 footers with digital displays of azimuth, elevation, transponder selection and feed horn orientation. Molniya dropped in on schedule on an 11 foot ADM antenna and the Russians seemed to cooperate Saturday evening when they scheduled a special 'expose' of the American CIA 'covert activities' against the USSR. Dozens of us sat around as CIA documents stamped 'top secret' and 'security clearance required' filled the screen with Russian video depicting tons of contraband seized (they said) at Russian border stations. One chap commented 'Our US Senators need to watch this program...then they would know what the cold war is all about!'. Some of the more amusing contraband displayed included copies of **PLAYBOY**, Levi Jeans and various feminine hygiene products. Each time the Russian program cut back to the CIA documents and they zoomed in on a particular line or paragraph (in English of course since this was purported to be a genuine item) a hush fell over the crowd assembled around the 9 inch monitor as we strained to read the document. Two attendees who spoke Russian told us what the Russian announcer was saying or the screen supers said as we read for ourselves what the English said. Fascinating!

Officially Stephen Gibson of Los Angeles was the second (after our STT effort) to catch Molniya with the 8-Ball antenna's Hayden McCullough close behind from Arkansas. After SPTS we heard from several more who rushed home to tune in Moscow. Tay Howard got his 15 footer aimed at

Molniya in short order after commenting to me at San Jose "I'll look, but I don't think I'll watch it". That was before he found it and called me three times in one day to exchange excited observations. "I admit it, watching Molniya is infectious" he noted. "I'm just excited!". He was. He also modified the popular Chaparral feed to copy the right hand circular signal from Molniya; we hope to tell you how he did it in September.

The weekend following San Jose, just as Susan and I were catching our breath, Steve and Carole Birkill from Sheffield, England dropped in for an overnight stop. They were in the states where Steve was consulting for a US firm that plans to open a sales office in Cairo (Egypt, not Illinois) to peddle high dollar personal terminals to wealthy middle eastern folks. We spent some time looking at Molniya, hooking up a new Pulse Width Modulation detector Steve built recently and generally exchanging notes. We'll have some exciting news about a new Atlantic Ocean region international satellite that places a 31 dBw signal over the eastern third of the US in the September **CSD**; courtesy of Steve. This one has as many as 5 TV channels operational and uses a standard 7.5 MHz audio sub-carrier... but you will have to wait until September to learn more!

The hardware in San Jose was fantastic; but with limited exceptions still not generally available in quantity. I was disappointed that the new production version of the Tay Howard receiver did not make it to San Jose, equally disappointed that John Rohner's LNA + receiver for \$1500 was not quite operational. A new firm shipping out of Honolulu called SATRX however had a neat receiver on hand which they are shipping in 100 receiver per month quantities now, and some of the advanced prototypes from other firms looked very promising.

We will remember San Jose as the seminar where the bottom fell out of the LNA pricing. \$795 for a single 120 degree K, 50 dB gain Avantek and if you and a few friends bought ten, knock off another \$125 or so. I don't see this being a temporary price decrease but rather a permanent drop. They'll get down to \$500 yet! (And I remember Avantek telling us in Miami that they didn't see pricing dropping below \$1000 for several years!!!)

The single most exciting technology item at San Jose had to be Robert Luly's "Umbrella Antenna"; featured on our front cover this month. Can you imagine a 12 pound ten foot antenna that folds up into a package about 6 feet long by 9 inches wide and high? Or a 15 foot of the same design that weighs 15 pounds? We got Luly to show us a private demonstration of his wonder July 4th and then we broke the antenna to the attendees in our Saturday morning 'Today At SPTS' TV show. Luly was mobbed Saturday and well he might have been at \$495 single lot pricing for the 10 foot (\$750 for the 15 footer). I don't know what others are doing but I am packaging his 15 footer with a Sat-Tec receiver I have built into a Sony 8 inch battery operated color TV. I plan to spend September flying about the Caribbean putting on 'airport satellite TV shows'. A fellow can hit the ground and be showing off satellite TV in ten minutes time, all on the battery power, with a package you can carry under your arm in a two-seater airplane thanks to Luly's creative genius.

Boy was San Jose neat. I can't wait for the next SPTS!

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TECHNOLOGY

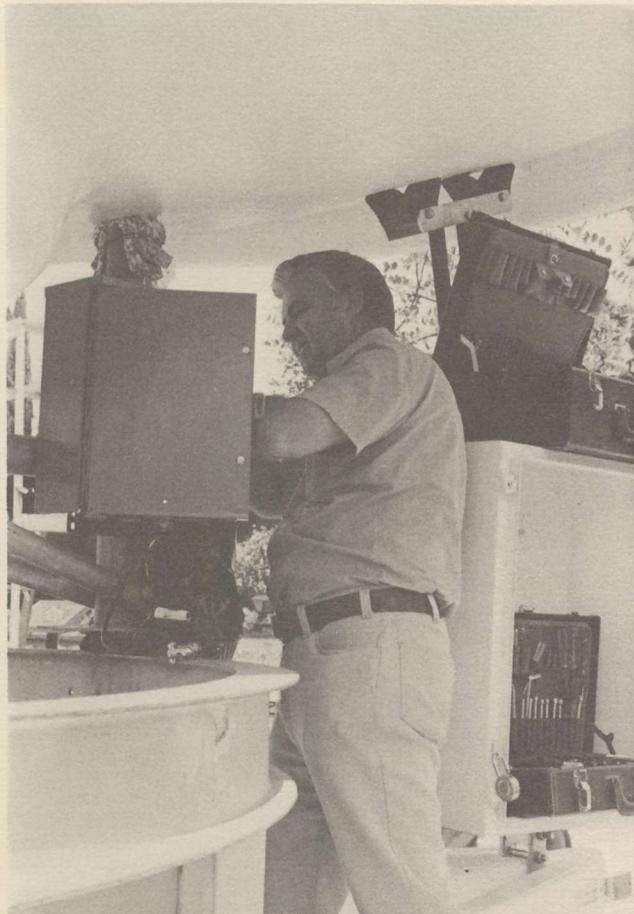


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WHO HAD WHAT AT SAN JOSE?

SAN JOSE EXHIBITOR REPORT

A record number of equipment exhibitors were on hand at SPTS '80 San Jose and each offered new innovations in either hardware or pricing not seen at prior SPTS events. When you consider that the first SPTS, one year ago this month, attracted only 8 real exhibitors, the growth within the industry has been phenomenal indeed. It is also important to note that several of the San Jose exhibitors attended either the Oklahoma SPTS or the Miami SPTS as **attendees**; saw what was available, and then returned home to create their own products for sale in this young industry. Nor is the innovation over; several people attending the San Jose gathering told us privately that they



CHUCK COLBY - making adjustments on the Microwave General extremely well equipped 16 footer trailer mounted system.



SUSAN COOPER - welcomes the San Jose group to STT's third seminar in a year. In the office she often wears roller skates!

would be on hand at the **next** Seminar with new products of their own.

Because of the intense interest in the products and services offered, here is a run down of each exhibit along with information that will help you contact the firms for further information if you were not on hand yourself in San Jose.

Booth #1 - DEXCEL, Inc. (2285-C Martin Avenue, Santa Clara, CA 95050) brought a series of 30 and 50 dB gain low noise amplifiers along with GaAs-FET devices which the home builder can incorporate into his own LNA design. DEXCEL's posture of providing GaAs-FET devices and builder assistance is unique in this field for a GaAs-FET supplier and you can find out more from Art Kawai (408-727-9833).

Booth #2 - AVCOM of Virginia, Inc. (10139 Apache Rd., Richmond, VA 23235) had two new versions of their PSR series receivers to display. The COM-3R has switch selectable tuning, AFC, remote control capability (i.e. change transponders from a remote point), and a most attractive new black and silver housing. The COM-3R adds a 24 channel remote control capability with remote antenna polarization switching. The original PSR-3 receiver continues to be available. AVCOM has also added a line of pre-installed connector equipped coaxial down lines in the 80 and 40 foot lengths. The number of antenna firms utilizing the original PSR-3 receiver in their booths speaks well for the industry's acceptance of the Hatfield product. In tests conducted on the Russian Molniya-3 reception, the PSR-3 receiver displayed the best overall picture quality against two other receivers tested. Contact Andy Hatfield at (804)320-4439.

Booth #3 - Microwave General Corp. (2680 Bayshore Frontage Rd., Mountain View, CA 94043) has been selling 10 foot and larger high quality earth station packages for about one year on the west coast. Chuck Colby has expanded the firm's product line to now include a wide



WILLING HANDS - McCullough had plenty of help in getting his 12 footer re-created and assembled at poolside.

variety of feeds (from simple horns to scalar loaded ortho-mode or dual polarization), antennas from 10 feet to 16.6 feet and a fascinating selection of low profile antenna mounting systems and digital display antenna position indicators. Colby's approach is to build the best hardware technology knows how to build and to package it so that it is simplistic to use for the layman and even environmentally pleasing (he offers his antennas in sand-brown and leaf-green so they blend into the surroundings!). More information from (415)969-3355.



8-BALL FRAMING COMPLETED - now the screening is applied.

Booth #4 - Vidiark Electronics Development Co. (P. O. Box 57, Salem, Arkansas 72576) brought the '8 Ball Antenna' system to San Jose. Setting up at the eastern edge of the Hyatt pool deck McCullough and Canada's David Brough proceeded to dazzle the non-believers with watchable (although not perfect) pictures from a six (6!) foot 8-Ball. The parts for the 8-Ball antennas got mis-placed someplace between Arkansas and California and McCullough was forced to improvise with materials from a local lumber yard to get a 12 footer up and running. The six footer was intended more as a novelty but so



TRANQUIL SCENE - The sun, the pool and satellite antennas. It all seemed to blend together for four days.



RAISE IT UP - 12 foot 8-Ball is pushed upright by a contingent of volunteers.

many people showed serious interest that McCullough decided to make a product out of it calling it (in a moment of inspiration) 'The Camper Special'. Canadian Brough has installed quite a number of these spherical antennas in northern Canada and in one test against a Telesat (Canada) 12 foot parabolic found the side by side pictures identical on both antennas; something that probably didn't make Telesat too happy since they had \$20,000 in their super-deluxe 12 foot installation! You can find



ONE LAST TACK - and the 12 foot 8-Ball is ready to start receiving pictures.

out more from Hayden McCullough at (501)895-3167.

Booth #5 - Chaparral Communications (P. O. Box 832, Los Altos, CA 94022) brought both their Tay Howard designed scalar loaded feeds and their sectionalized knocked down parabolic dish and mount to San Jose. The feeds went well (nearly 100 sold and delivered on the spot) and the antenna was installed to provide a signal feed for the



THERE IT IS - David Brough gestures to reception from the hastily assembled 12 foot 8-Ball antenna after he and Hayden McCullough directed the task of creating an 8-Ball from locally acquired parts and materials.



CHAPARRAL panelized dish fed signal to the SATRX suite.

SATRX (suite 302) receiver. Designer Bob Taggart is a very clever fellow with mechanical designs and packaging and we expect he will be bringing out more innovative products in the future. His feed works better (see report in the July CSD) than a standard horn but we heard some grumbling from other would-be feed designers that suggests to us that we haven't heard the last word in feed innovations yet. Contact Taggart at (415)941-1555.

Booth #6 - ICON Electronics (333 McPhillips Street, Winnipeg, Manitoba R3E 2K9) brought down a two-receivers in a single cabinet system plus a 96 degree Kelvin LNA designed and built in Canada. The receivers tune all 24 channels and share a common power supply and metering. A built-in power divider allows you to plug in a single antenna downline run plus there is a 4 GHz looped output to drive additional receivers. LNA powering (16 VDC) is built-in. The Spacecamp LNA has 40 dB of gain, covers 3.7 to 4.2 GHz (as it should) and comes out in a standard CPR229G flange to which you bolt your feed antenna. Having product manufactured in Canada will be good for the Canadians who to now have had to fight the border crossing battles but as we shall see ICON was not the only Canadian firm on hand in San Jose. Details from (204)284-1703.

Booth #7 - Hubbard-Payne (aka Hubbard Telephone Contractors, Inc.; Suite 113, 4811 Clinton Hwy, Knoxville, TN 37912) brought a 14 foot antenna system that looked like it climbed right out of Star Wars. Ralph Payne has been working on this very neat package for some time and we think he has a winner here. Payne had one of the most professional booths and products at the show and he seemed to have his marketing program together; by the second



COOP [left] - introduces Taylor Howard [center] and John Ramsey [right] during a San Jose session entitled 'Mass Production Receiver Techniques'.

day there were plenty of people wandering around wearing Hubbard-Payne T shirts! The 14 foot size is just about right for the southeastern US. For more details contact Ralph Payne at (615)688-6281.

Booth #12 - Comm-Plus (Nelson Ethier; 3680 Cote Vertu, St-Laurent, Quebec H4R 1P8) brought a long list of first-time-seen Canadian created TVRO products to San Jose. The most intriguing was their Teknimat 692A TVRO receiver. It features a servo-lock digital pushbutton tuning with auto scan. You push the scan activate button and the receiver climbs through all of the transponders with a digital display of the one you are looking at. There is even a clever vertical and horizontal polarization indicator. The TVRO signal is processed with a digital circuit and the demodulator gets away from the 564 PLL with a passive approach. Audio on 6.2 or 6.8 is built-in and there are a pair of large, illuminated meters to give you center tuning and signal strength readings. The housing has an anodized front panel with a wood veneer cabinet and the unit looks more like a space age stereo tuner than a TVRO receiver. We expected it to be the most expensive receiver at San Jose; it wasn't, and that surprised us. Comm-Plus also had a series of antenna feed horns (standard horns starting at \$49.50), a polar antenna mount and they offered molds for the Nelson TVRO Parabolic Antenna Manual described 10 and 12 foot antennas. We were impressed with the people associated with this Montreal outfit and they could go far. For more information, contact them at (514)337-7255.



HUBBARD-PAYNE's ESA-14 dish gets a final tweek from Ralph Payne [on ladder].



ANTENNAS-ANTENNAS-ANTENNAS. Left to right, Satellite Television Systems [edge only], Lindsay, MA/Prodelin and Microwave General.

Booth #13 - Lindsay Specialty Products Ltd. (50 Mary Street W., Lindsay, Ontario) first displayed a TVRO antenna at Miami. Their latest version is more than a generation better; it was superb. They offer a 13 footer that ships in panels and based upon some non-professional and therefore hardly 'sanitary' tests at San Jose they have a feed that will give the Chaparral a run for its money. Lindsay's John Thomas has been building antennas for (it seems) decades and he is a tough, shrewd businessman who doesn't give up easily. His present product is rugged, looks great, and performs well. The mount however could still use some work. Lindsay has turned out (literally) millions of home and CATV antennas through the years; they'll be a force to be reckoned with.

Booth #14 - Ramsey Electronics (P. O. Box 10101, Rochester, N.Y. 14610) brought their new Sat-Tec receiver plus modules and parts for the home builder. The Sat-Tec receiver like the AVCOM was widely utilized by the antenna folks to display their reception. In fact David Brough had a Sat-Tec in the 8-Ball display which he had modified with a remote control equipped with digital readout. Our initial review of the Sat-Tec receiver in the July CSD now gets this addendum: on the Russian Molniya reception we were experiencing baseband (or high frequency) noise after we had built the 4 GHz signal up to the point that we had no sparklies. When we went to add a Birkill PWM decoder for the audio we found we had high noise levels that covered the PWM pulses. We eventually traced the problem to a very tilted response in the Sat-Tec receiver's video amplifiers; with the chroma running 8-10 dB higher (by reference) than it should have been. We also found a damped oscillation occurring around 4.5 MHz or so. None of this affected the apparent quality of the DOMSAT video signals

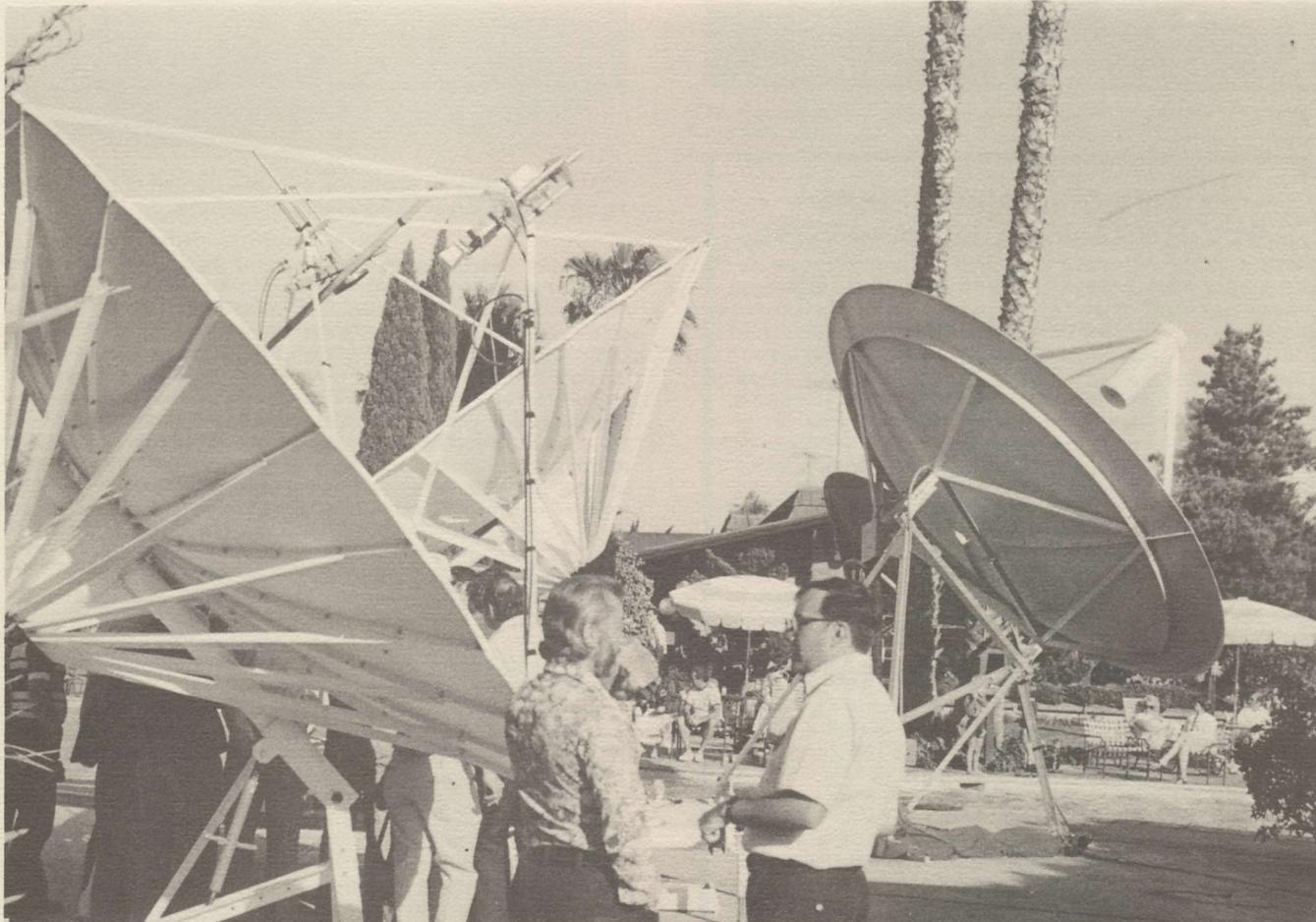
but when you connected a scope to the video output while tuned to a color bar signal there was a very strange display that certainly did not look like a color bar; the signal to the scope was largely chroma and very little low frequency (sync) information. Our test receiver has gone back to Sat-Tec at this writing to get the problem fixed. Had we not been chasing Molniya and wanted the PWM signal we probably would have gone merrily along never aware of the problem. That addendum aside, Ramsey appeared in San Jose with around two dozen of the little receivers and they quickly were snapped up. During a panel discussion on receiver mass production Ramsey suggested that a monthly production run of around 100 receivers was probably realistic from this point forward. For more information call Ramsey/Sat-Tec at (716)381-7265.

Booth #15 - Sat-Tec (see booth number 14).

Booth #16 - Satellite Supplies (Box 278, Aldergrove, B.C. VOX 1AO) were on hand to show off the commercial models of the Taylor Howard receiver. Unfortunately they were short by perhaps two weeks of having the units in full production and ready to show. That didn't keep them from talking the unit up and acting like they would be shipping 100+ receivers per month about the time you read this (or by September if not in August) and you can now telephone Peter Cook or J. R. Walsh at (604)859-6315.

Booth #17 - VITALINK (701 Welch Road, #225, Palo Alto, California 94304) was to show off 12 GHz gear. It appears the firm is in the midst of some type of major product change and if you are able to figure out where they are going and with what, you might let us know! Their telephone number is (415)328-9972.

Booth #18 - SATELCO (5540 W. Pico Blvd, Los Angeles, CA 90019) continues to concentrate on offering special hardware



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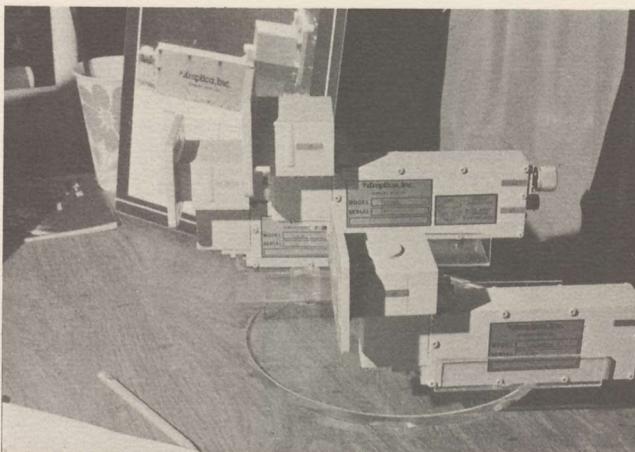
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packages to off-shore buyers. As best we can determine, they are dealing in customized antenna, LNA and receiver packages intended for use in the middle east, Africa, South America and the Pacific. They have a history of handling electronics hardware for export and they seem to be following the same procedures for TVRO installations. You can call Sam Kleinman about all of this at (213)931-6274.

Booth #19 - AMPLICA, Inc. (950 Lawrence Drive, Newbury, Park, CA 91320) brought their high quality LNA line to San Jose and dazzled us with a fish tank that had an LNA operating underwater. Naturally you probably won't install yours there but it is nice to know that in case you get a lot of rain in your area your LNA won't quit working even if your antenna goes below the waterline! They had a very professional crew that knew what LNAs are all about. It appeared that they were caught somewhat by surprise by the AVANTEK LNA price drop but we suspect they'll stay competitive none the less. You can learn more by contacting Jim Cole.



AMPLICA LNAs - a booth full of exotic hardware ready to go home with the buyer and pop onto an antenna.

Booth #20 - Howard/Coleman Circuit Boards (RFD 3, Box 58-A, Travelers Rest, S.C. 29690) had a busy booth through much of the show. Robert and Lib Coleman and Annie Howard displayed raw boards, boards with parts stuffed and a customized receiver built by Californian Lance Ginner using the boards designed by Tay Howard and Robert Coleman and manufactured by Coleman in SC. We heard one fellow saying that the boards plus the instructions made it possible for him to build his own receiver; he was uncertain of his own capabilities to duplicate the straight Howard receiver from the Howard Manual and when the boards became available that gave him the confidence and direction he needed to do it on his own. Lots of people apparently feel the same way and for the builder this remains one of the best ways to go. More information from Bob Coleman at (803)834-9030.

Booth #21 - Telemetry Communications & Instrumentation Corp. / Swan Antennas (411 N. Buchanan Cr., #3, Pacheco, CA 94553) brought together the original Swan Antenna plus a new receiver designed by C. E. Green of TCI. It was good to see the Swan family (Oliver's brother Henry and his son Alan) back into operation with an antenna product that has all of Oliver's original magic plus a very professional construction and assembly approach. Green's TCI has an interesting dual conversion receiver that is extremely handsome (packaged something like the main portion of the Washburn receiver) with lots of built-in features. Included is a video gain control, an AFC on-off control, audio gain control and switch selectable 6.8 and 6.2 MHz. The RF output is on VHF channels 3 and 4 at a very healthy 350 mV which can directly drive several thousand feet of RG-59 or 11 cable without additional amplifiers. They also have a 70 MHz IF output jack (plus rear apron twin video output jacks and an audio output



SWAN SPHERICAL - the original, manufactured by Henry and Alan Swan teamed up with TCI's C. E. Green to package a system providing high quality reception with multiple-satellite visibility.

jack in addition to the VHF channel 3 or 4) which is very handy for plugging in a CATV field strength meter or wideband scope or spectrum analyzer. It is a high quality receiver product priced under \$2,000. For more information contact them at (415)676-6102.

Booth #22 - AVANTEK, Inc. (3175 Bowers Avenue, Santa Clara, CA 95051) brought their LNAs plus their devices such as the VTO 8360s. This was another well laid out, professional booth that was on hand to do business. Most of the discussion on LNA pricing was heard away from the booth but we did learn that if you are a distributor and can manage to order say 100 of the units you can expect to pay around \$550 for them; or if you can order ten at a time the price will be closer to \$675 (give or take a few dollars). This then explains that \$795 single lot retail prices you now see popping up in **CSD** and elsewhere. There was much speculation about whether this price drop for a 120 degree K LNA, 50 dB gain with a DC power block (to allow you to feed your DC operating voltage back up your 4 GHz downline) was temporary or not. The Seminar was ripe with rumors that the price drop was temporary because of an over stock of LNAs; we could not substantiate that rumor. You can do your own checking by calling Jim Lindauer at (408)727-0700.

Booth #23 - ICM / International Crystal Manufacturing Co., Inc. (10 North Lee, Oklahoma City, OK 73102) brought along a surprise. Their now well established TVM-4200 receiver had a new companion in San Jose; the TVM-4300 which had a large sign on the booth that proclaimed it to be priced at \$995 in single lot quantities. The 4300 is fully tuneable, dual audio outputs (6.2 or 6.8), built-in LNA power supply, built-in AFC (plus manual fine tuning), and a set of baseband audio / video outputs to drive an external modulator or loop through your VTR to use that modulator. A plug in remote control is also available (\$99.50) as are non-standard audio demodulator frequencies including a stereo audio demodulator package (\$89.50) for the aural services now popping up on odd-ball sub-carriers. The model TV-4300A has the remote control



ICM'S NEW TV-4300 - the latest satellite TV receiver from International Crystal features 24 channel tuning, optional remote control package and stereo decoder system for sub-carrier stereo channels.

plus the selectable audio options available for \$1149 in single lots. Paul Shuch was on hand to explain the inner workings of the receiver and this one was first seen in Miami as a Shuch prototype. For more information, contact Royden Freeland at (405)236-3741.

Booth #24 - Rohner & Associates (501 N. Elm Street, West Liberty, Iowa 52776) had hoped to have three of their new digitally operated combo LNA plus receivers on hand in San Jose, operating. Alas, the single unit on display was not operational but John Rohner said they missed it by only a matter of days. Rohner's booth provided no-charge computer derived antenna pointing charts for anyone that remembered their geographic coordinates and **CSD** author Norman Gillaspie (June and Sept.) moved in with his circuit boards for single conversion receiver front ends and his new NEC powered LNA which it turned out John Rohner was also utilizing. In spite of the (non) operational status of the Rohner Converting Video Receiver, the booth was always busy with people who wanted to talk shop (John is one of the most open individuals in the field; he'll gladly share with you anything he is doing!) and his contributions to this young industry in the years ahead may well prove to be substantial. Their sub-carrier and biasing boards were of course on hand. You can find out more by calling John Rohner at (319)627-4819.

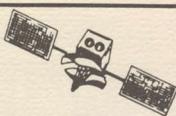
Booth #25 - Wagner Industries (P. O. Box 559, Alva, Oklahoma 73717) brought a line of Spherical TVRO antennas out at San Jose. We are not sure just what the acceptance of their product may be and suggest you talk with David Wagner directly as they played it pretty low key in San Jose. Call them at (405)327-1877.

Booth #26 - Washburn Receiver (Clyde Washburn, 195 Thayer Road, Fairport, N.Y. 14550). Clyde brought along the latest version of his receiver, one he says he is **totally happy with**. We can tell you this, there were no better pictures on any receivers at San Jose! Clyde has (as you might have heard or surmised) terminated his previous arrangement to have his receiver produced commercially, or in kit form, with Ramsey Electronics and substitute arrangements were not complete by San Jose. At the moment Clyde is helping anyone who needs assistance in getting their own Washburn designed receiver up and running, but he is **not** in the kit, parts or completed unit business at this writing. However, he is trying to resolve the problem and we can report that there was a brisk business in his manuals at San Jose in spite of the uncertain status of the receiver in kit or commercial form. We hope he gets it into regular production soon because we still believe this receiver has low-signal level operational features still not found in even the best (and most expensive) 'commercial' receivers around.

Booth #30 - Star / Satellite Television Systems (P. O. Box 51837, Lafayette, LA 70505) had a very fine looking and performing 13 foot dish with a polar mount that really **did** track through the full satellite belt with a minimum of

The

8-BALL



12-FOOT SPHERICAL

SATELLITE TELEVISION ANTENNA KIT

LIST PRICE: \$750.00

- Rugged steel frame
- Aluminum screen reflector surface
- Durable redwood strips support reflector screen
- Easy to assemble
- Easy to align
- Receive signals from several satellites
- Very low cost

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AVANTEK IN STOCK

MODEL 4205 LOW NOISE AMPLIFIER (LNA)

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- 1.5 dB MAX NOISE FIGURE (120°K)
- DC POWERED UP CENTER COAX CONDUCTOR

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MODEL DCB-42 OPTIONAL DC BLOCK

- DC VOLTAGE BLOCK AT RECEIVER END

PRICE \$50.00

MODEL VTO-8060 VARACTOR TUNED OSCILLATOR

- 600-1000 MHz FREQ. RANGE
- 3-40 VDC TUNING VOLTAGE

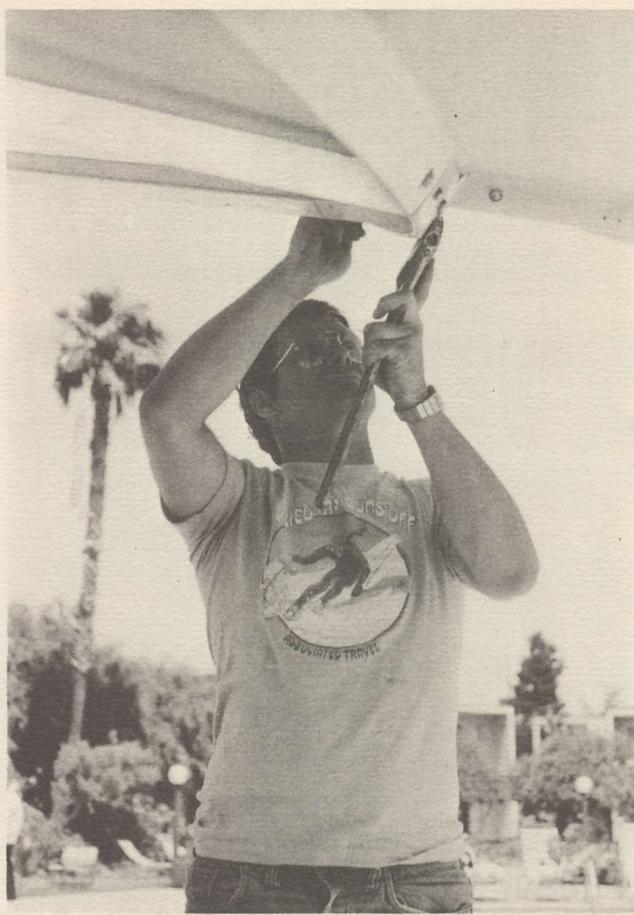
PRICE \$150.00

DELSTAR SYSTEMS

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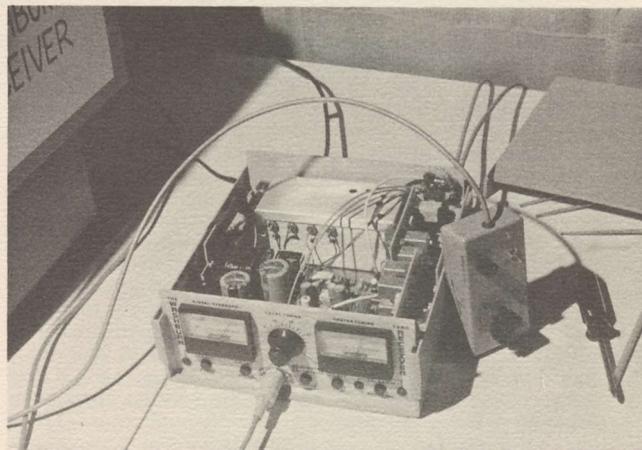
tracking error. There is a raging argument these days as to whether **any** polar mount can track from F1 (135 degrees west) to D3 (87 degrees west) without falling 'out' of the Clarke orbit belt. Those who say it cannot be done with adequate precision to follow the satellite belt should see the Star mount work. There have been some organizational changes at Star recently and you may find yourself talking to a new name or two when you contact them. We were assured it is business as usual and we hope so since they have a fine product that deserves a shot at the industry. You can learn more by calling them at (318)234-2495.

Booth #31 - ADM / Antenna Design & Manufacturing Co. (P. O. Box 1178, Poplar Bluff, MO 63901) brought a pair of antennas to San Jose; one they pointed at the regular Clarke orbit belt and at our request the second was used for the Molniya search operation. We asked them to dedicate one antenna to Molniya since we have been utilizing an ADM antenna here in



NORM GRIFFITH - puts the final bolt into the STAR 13 foot polar mounted system; remote controlled from the viewing spot.

Oklahoma on our own Molniya experiments; and we simply felt more comfortable setting up poolside in San Jose using the same antenna we use in Oklahoma. Jamie and Linda Gowen are fine people, perhaps as nice as anyone in this young business and after we zeroed in on Molniya Jamie told us he was heading right back to Missouri to do the same thing. Their latest antenna is slightly different than our nearly year old



WASHBURN's receiver - present and operational offered builders an opportunity to see one all put together [and operating].



WRONG WAY ANTENNA - closer ADM 11 footer pointing at Molniya gave everyone an opportunity to see what Russian television looks like.

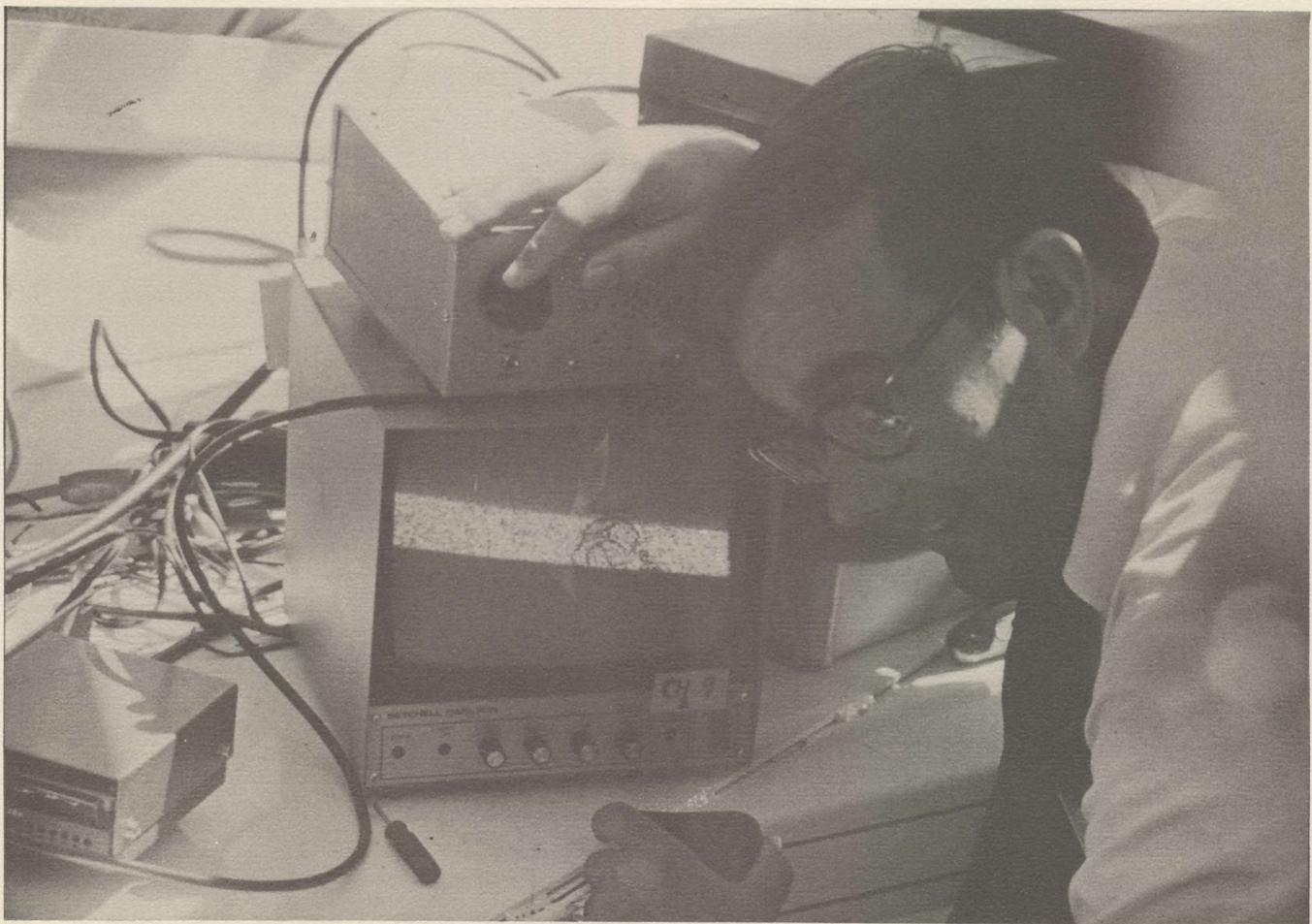
model and it goes together easier than ours did. These are good solid people with a good, solid product and the industry is better for their being involved. Jamie still expects to bring out a 13 footer as soon as he gets caught up. You can reach them at (314)234-2495.

Suite #302 - SATRX (250 Kawaihae St., Mt. Terrace, Suite 8A. Honolulu, HA 96825) was a bit of a surprise since they didn't have any advance publicity to prepare us for their



'MAD-MAN' MUNTZ - came to San Jose, is now dealing in 6-10 terminals per month largely in Southern California, and our camera caught Tay Howard near Muntz's van. Will Muntz come out with a \$295 home terminal? Stay tuned!!!

receiver. Priced in the \$1250 region we were impressed with both the performance and the construction. Barney Phillips who heads up the firm seems to have both feet planted squarely on the ground and he insists that he'll get along on a production run of 100 radios per month or so for the balance of the year until he is convinced the marketplace is really big enough to justify jumping into

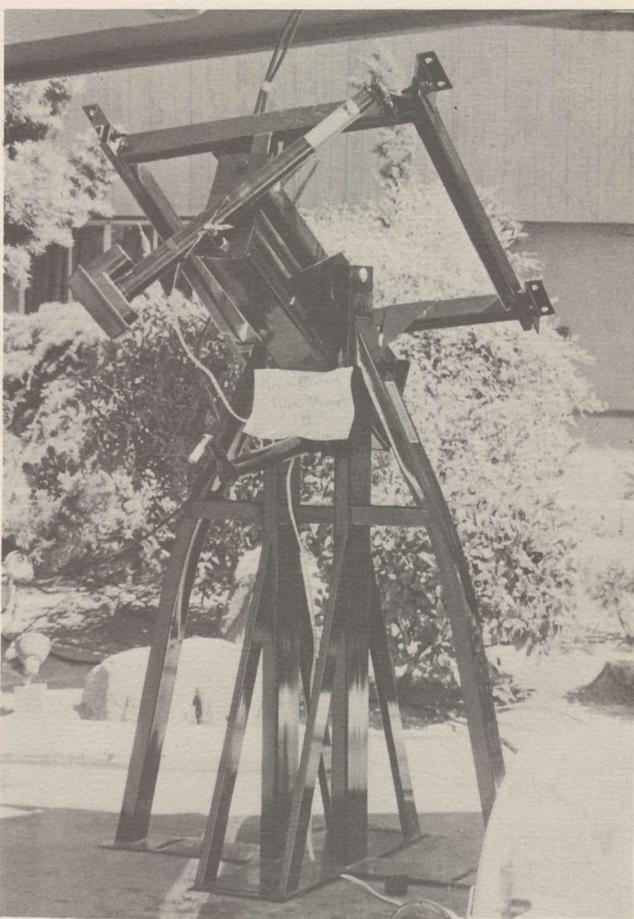


THEY ARE SPEAKING RUSSIAN! Navigator Gibson strains an ear to hear Russian audio from the Molniya reception test.



PROUD H. PAUL - stacking his TVM-4300 receiver up against the Sat-Tec unit on Molniya reception (partially visible on screen) Shuch was satisfied his newest creation was capable of Russian standard's reception.

the hundreds or thousands per month class. We were fortunate enough to get a peek inside the receiver and could see that somebody has done an excellent job of designing



MOTORIZED POLAR MOUNT - from H & R / Starview carries \$995 price tag; it ships on a pallet.

it so that it could be produced in big quantities. It has a hand held wire remote control, tunes all 24 channels and should be a big seller. You can talk with Barney at (808)377-6195; remember he is in Honolulu and he is still sound asleep when it is 9 AM on the east coast!



FOR THE RECORD - Cooper [center] doing a videotape interview with Paul Shuch [right] and ICM's Royden Freeland [behind Shuch] for running on the next day's "Today At SPTS" TV show run daily at 8 AM.



ASSEMBLING A DISH - hundreds of man hours went into assembly of antennas for SPTS; here crew for MA/COM [Prodelin] completes assembly on 10 footer.

Suite #402 - Microwave Associates Communications Co. (Firm Caller 535, Burlington, MA 01803) brought a ten foot antenna manufactured by a recently acquired MA/COM affiliate firm (Prodelin) and a very professional staff of engineers and sales people. They were in San Jose to 'test' the waters for establishing a network of dealers for their high quality CATV/broadcast commercial gear (plus their Prodelin antennas). The Prodelin 10 foot antenna is probably the neatest (as in most professional) ten foot package available these days but it is not inexpensive. Their VR3 and VR4X receivers are standards of comparison in the 'professional' CATV world and if they decide to jump into this private terminal area with both feet we'll all know it! You can find out more about their dealer program by calling J. Duke Brown at (617)272-3000; extension 1886.

Suite #502 - Satellite Television Systems, Inc. (R #1, Box 132B, Poplar Bluff, MO 63901) appeared with a TVRO antenna line that looked great. They take a panelized approach like ADM but their cosmetic finish is outstanding which indicates somebody has done their homework in designing the package. We overheard several wives telling their husbands 'that is the one I want in our yard' which indicated to us that these people will do well. In addition to looking good and working good, their antenna knocks down for shipment via UPS which of course ought to make them a national force in the antenna business. You can contact Danny Hogg for more details at 1-800-325-0761.



SHIP IT UPS! - Satellite Television Systems private terminal dish was a pleasing mixture of dark and light brown colors.

Los Angeles Suite - The Sound Company (4676 Admiralty Way, Suite 732, Marina Del Rey, CA 90291) brought their own antenna package and a new proprietary receiver design to San Jose. Their suite was always crowded and it had perhaps the largest concentration of video gadgetry of any booth at San Jose. One item we saw that was very impressive (but had nothing to do with the direct TVRO package) was a portable projection TV system that produced the highest quality wide or big screen TV we have ever seen. These people seem to know what the **whole** business is all about and their total package approach (from dish to big screen TV) ought to do well in the upper dollar brackets of this business. You can talk with Joe Miyasaki at (213)777-7737.

Regency Suite - H & R Communication / Starview Systems (Route 3, Box 103G, Pocahontas, Arkansas 72455) showed once again that a young, energetic group from Arkansas can make things happen. John Hastings and crew ran a very professional operation at San Jose with trailer mounted rigs on display (they sold the three they brought with them), a new motorized mounting system (\$995 and very nifty), and antennas up to 16 feet in diameter. In the receiver department Starview seems to have all of the bases covered, offering Commtech 'professional' units right on down the line with ICM receivers

THEY CALL THIS BIRD MOLNIYA



A whole family of Russian satellites circling over North America and beaming live Russian television back into the USSR. Now because STT has researched the Molniya reception challenge and developed hardware modifications and software systems to produce high quality Russian television throughout North America, you can share in the excitement of this ultimate satellite TV fantasy!

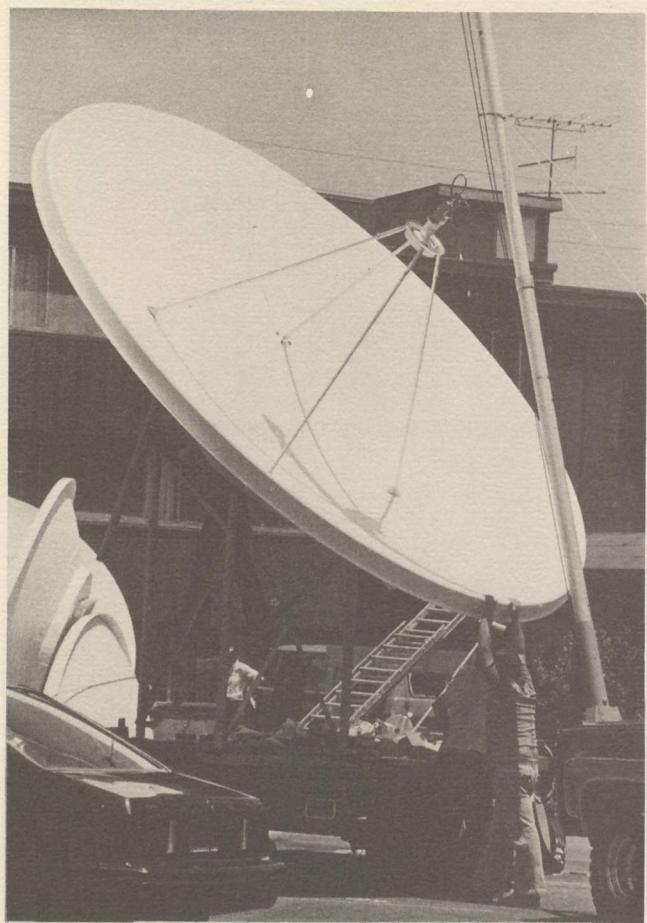
Until you have witnessed Russia's approach to national television service, you cannot appreciate how fortunate we are to have a multi-channel national service of our own!

STT has put together a 90 minute (approximate) special videotape that explains in great detail how you set up to receive the Russian Molniya transmissions. All of the technical changes required plus a thorough understanding of the unusual moving/inclined-orbit of the Molniya series birds is explained in this special tape.

PLUS - this tape includes a report on the San Jose SPTS reception of Molniya **and** an interview conducted at STT in mid-July with English experimenter Steve Birkill who pioneered reception from both Molniya and Russia's Ghorizont Clarke-orbit birds.

STT videotape THS-1 is available for immediate shipment. Specify VHS or BETA format. Price \$60 postage paid US and Canada; \$65 (US funds) outside of US Canada.

STT P. O. Box G, Arcadia, OK 73007 405/396-2574



TRAILER MOUNTED - 16 footer from Starview is lifted into position by a winch and gin pole.

on the low dollar end. They also had an operating 'everything at the feed' antenna system which they characterized as 'experimental'. H & R has done more to get people into the dealer business, to date, than anyone else in this field. Talk with John Hastings at (501)647-2001. Then there was the **Umbrella Antenna** from Robert A.



BEFORE THE CROWD - inside of this dome-tent shortly after picture was taken Bob Luly hooked up his Umbrella Antenna. Then for six hours straight people lined up to go into the tent to view pictures on fold-up antenna.

Luly & Associates. Luly was not an exhibitor but he did put on a number of demonstrations with his innovative antenna design and he brought with him a talented crew of cohorts. You can contact Luly about the 10 and 15 foot size antennas at P. O. Box 2311, San Bernadino, California 92406 (714)884-9010.

TECHNICAL CORRESPONDENCE AND NOTES

ANTENNA POINTING PROGRAM

I don't know how many readers would be interested in having a computer program in microsoft that can run on virtually any computer with 'Basic' language but I have developed one to help people determine just where their bird orbit line is from their location. If the program is run(ning) properly the elevation will 'break' as the run passes your longitude. As an example, if your longitude is 121.9 then COMSTAR D1 at 128 will be at 41.6, WESTAR II at 123.5 will be at 42.02 and SATCOM FII will be at 41.95. Since FII is almost exactly the example longitude it will have the highest look angle or elevation in your sky.

John P. Rohner
W. Liberty, IO 52776

Rohner's program follows:

```

10 REM COMPUTE SATELLITE TVRO ANTENNA AIM-
COORDINATES
20 REM CONSTANTS - RS IS IN NAUTICAL MILES - USE
42166 FOR KM
30 K = 6.61 : PI = 3.1415927#: RS = 22766
40 REM BASIC COMPUTES IN RADIANS SO THESE ARE
THE CONVERSIONS TO/FROM DEGREES
50 DEFFNRAD(X) = X*PI/180
60 DEFFNDEG(X) = X*180/PI
70 DEFFNACSN(X) = ATN(X/SQR(-X*X + 1)) + PI/2
80 REM INPUT ANTENNA COORDINATES IN DEGREES
(&.&.&.)NO MINUTES/SECONDS
90 INPUT "ANTENNA LATITUDE"; AD
100 INPUT "ANTENNA LONGITUDE"; HD
110 PRINT
120 REM I = NUMBER OF DATA ENTRIES (NAME, LOC)
TO BE PROCESSED
130 FOR I = 1 TO 5
140 READ SNI,SL
150 W = FNRAD(SL); H = FNRAD(HD):A = FNRAD (AD)
160 L = (H-W)
170 D = FNACSN(COS(A)*COS(L))
180 REM C = TRUE AZIMUTH
190 C = FNACSN (-TAN(A)/TAN(D))
200 IF L < 0 THEN C = 2*PI-C
210 CD = FNDEG(C)
220 REM EL = ELEVATION BEARING
230 EL = ANT(COS(D)-(1/K)1/2SQR(1-CSO(D)*COS(D)))
240 Y = FNDEG(EL)
250 REM RG = RANGE TO SATELLITE
260 RG = RS*SQR(1-(2/K)*COS(D) + (1/(K*K)))

```

270 PRINT SN!TAB(11)“LOC.:;SLTAB (23)“BEARING:”;
 CDTAB(42)“ELEVATION:;Y;
 280 PRINT TAB (62)“RANGE:”RG
 290 NEXT I
 300 END
 310 DATA SATCOM 1,135, COMSTAR 1,128, WESTAR II,
 123.5, SATCOM II, 119
 320 DATA ANIK III, 114, ANIK B, 109, ANIK II, 107, ANIK
 1, 104, WESTAR I, 99
 330 DATA COMSTAR II, 95, XXXX III, 87, I-IVA-F3,34,I-
 IVA-F2,29.5,I-IVA-F1,24.5
 340 DATA I-IVA-F4,19.5

FEED HORN SUBSTITUTE

Nearly a year has passed since Oklahoma and SPTS '79. My family and I constantly talk about our trip and all of the wonderful people we met. I wish you published CSD every week for I read it the moment it arrives no matter what I am doing; keep up the excellent work!

I have decided to build Jim Vine's 16 footer (even to cutting the trees for the lumber) and Tay Howard's receiver with the Birkill bi-polar LNA (I fear the GaAs-FET is too risky for me). I started recently to make Howard's feedhorn but did not feel comfortable making it out of PC board. Sheet copper in small quantities is almost impossible to find so I chanced upon a less expensive way to do it.

Tay's feedhorn is 5 inches long so I took an ordinary, everyday 3" diameter copper drain pipe 5.5 inches long and I sawed a 'slit' lengthwise. I heated it carefully and evenly until I noticed the color 'change' following the flame and the metal itself was just barely red. I then allowed it to cool naturally (no water) and gently separated the saw cut enough to get my finders inside. Then I unrolled it along my workbench until it was flat, tapping lightly with a rubber mallet to finish off the sharp edges.

Clean it up with steel wool afterwards (restoring the bright shining lustre of the copper). I then bent the pieces in a vise to the sizes required by Howard. By using a tubing cutter the long edges when unrolled are straight and this allows use of a square for scribing. I used a fine blade in my saber saw to cut it; tin snips cause the pieces to roll and they deform the flat sheet. A piece of 3" copper pipe 5 1/2 inches long yields a sheet 9-3/8" by 5-1/2". I hope this helps others faced with the same problem.

G. H. (Ray) Clark
 Oak Ridges, Ontario
 Canada

We agree - finding small pieces of sheet copper is almost impossible anymore. We used some brass shim stock recently to build up a waveguide to coax adapter [See Coop's Satellite Operations Manual] but only after spending half a day trying to locate some sheet copper. A good suggestion and we thank you for it!

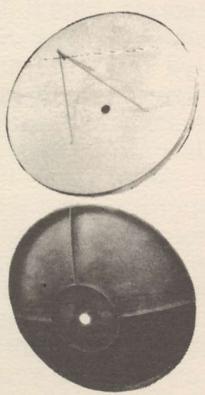
Now available at an
 affordable price...

PARABOLIC REFLECTOR ANTENNA

Big 10 ft. diameter fiberglass construction with 4 petals and center section. Bolts together easily in 45 minutes. Focal length 48.6, F/D Ratio .4, Gain 39db. Weight 185 lbs. Reflector only \$680.00. In lots of 10 \$585.00.

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TECHNICAL NEWS NOTES

EVERYTHING at the antenna receiver system demonstrated at SPTS San Jose by Starview was not Microdyne system after all. Apparently Microdyne has changed plans on how and through whom they will market system; Starview has developed own package of hardware which they are now testing.

UMBRELLA antenna demonstrated at San Jose will be in limited production by middle of August; Robert Luly expects to be able to turn out hundreds per month by early fall, in both 10 and 15 foot sizes.

FLIGHT rating of high power TWT tubes for 12 GHz DBS systems may be most critical element in any of the proposed systems. Present US and Canadian and INTELSAT birds utilize 5 and 10 watt TWT tubes which are documented by manufacturers for service 'in flight' in space. Higher power TWTs, such as 40 watt devices utilized by Russians and 200 watt devices utilized in recently failed Japanese BSE birds are not rated for flight service in space and are thus subject to infant mortality and pre-mature failures. One of the more significant challenges ahead for 12 GHz DBS satellites is the development of high reliability (i.e. flight rated) TWTs at the power levels required for DBS service.

HUGE panelized spherical TVRO and transmit antennas for DOMSAT and INTELSAT service being developed by USTC (Afton, Oklahoma). One 60 foot by 64 foot version, similar in concept to basic Swan Spherical, is scheduled for installation in central Mexico for reception from US domestic satellites by cable system there. Price will stop the average buyer however; in \$150,000 region.

POSSIBILITY that some of the STV feeds will go to satellite for interconnection has cropped up; Golden West Broadcasters, operator of STV services at several US locations, thinking about using satellite transponder to send out scrambled service to each of the terrestrial re-transmission sites.

LATEST snafu at NASA over constantly slipping Space Shuttle schedule is demand by several of the would be users (i.e. satellite launchers) that NASA schedule 2 flight tests of Shuttle prior to taking on commercial payloads. NASA opts for single test flight.

ARIANE launch service apparently will slip-schedule after failure of May test flight that dumped amateur radio satellite into Caribbean. Delays of up to six months are forecast, creating additional pressures on dozens of satellites now torn between slipping Space Shuttle and Ariane problems. Bottom line? Many space projects will wait longer to orbit than had been envisioned only months ago.

30/20 GHz test system moving ahead at NASA Lewis Research Center; some \$35 million is being allocated to design system that will when operational carry more spectrum traffic than present 4 and 12 GHz services combined.

INTELSAT moving towards time division multiplexing system for all narrow band circuits, expects to increase by factor of four the number of effective voice grade circuits that can be sent through given transponder space.



NEW MANUALS FROM STT

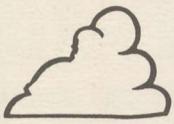
Stephen Gibson's 'THE SATELLITE NAVIGATOR' is possibly the finest manual ever assembled by STT. Author Gibson covers every aspect of satellite 'navigating' (i.e. the art of finding satellites from your spot on the ground) and **he builds into this latest STT manual** cleverly designed navigational aids including an inclinometer (to measure your antenna's elevation) and a Sun Compass (to help you accurately measure azimuth). Gibson goes from the very elementary mount (a laundry pole in the yard) to super sophisticated mounting systems including a complete electronic interface box to tie your motor driven dish antenna to your TRS-80 (or similar micro) computer for full 'autodish' operation. Filled with practical tips on mount design and construction, step by step instructions on 'boresighting' the satellites, computer programs galore and the word of an experienced man on trouble shooting your system. Bob Cooper says "I read this manual six times during the course of preparing it for publication; each time I found myself discovering new ways to modify my own antenna mounts. This manual may well be a curse to my spare time; after reading it I have dozens of new projects to get started on!" The price is \$30 postage paid US, Canada, Mexico; \$35 elsewhere. A must for any serious satellite terminal operator. See order card to right.

①

Nelson Ethier's 'PARABOLIC TVRO ANTENNA MANUAL' will probably make several people independently wealthy. Here is the full 'game plan' for starting up a business building 10, 12 (or larger) foot TVRO antennas, mounts and feeds. Nelson's manual will make everyone an instant expert on the nitty-gritty world of building superb, high-quality parabolic reflector surfaces. He uses a combination of fiberglass and metal to produce a professional looking, high-performance dish that virtually **anyone can duplicate** from his step-by-step plans for between \$300 and \$500. PLUS - he suggests that after you build a mold for your first dish that you rent the mold around to others in your area so that you in effect become a supplier in the antenna field! Nelson is a bug for having precision workmanship and he gives you complete instructions on achieving a 1/8th inch surface tolerance over the 12 foot surface. Formulas and instructions included will assist anyone who wants to build larger-than-12 foot antennas to do so. What a neat way to turn your garage into a factory! The price is \$30 postpaid in US, Canada and Mexico; \$35 elsewhere. Don't start building your own antenna until you study this manual carefully!

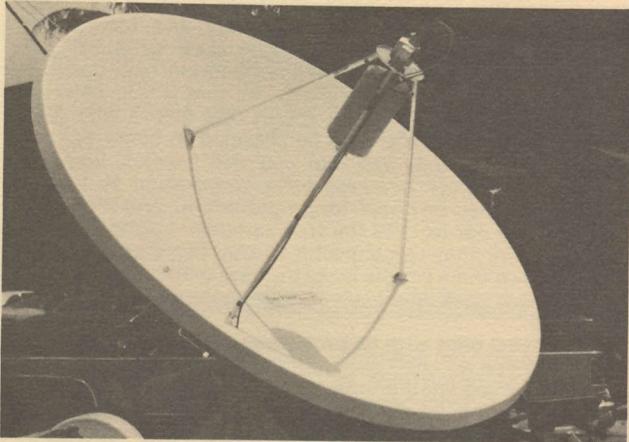
②

Bob Cooper's 'SATELLITE OPERATIONS MANUAL' probably should be kept under lock and key in your TVRO viewing room. Coop has been assembling data from people who like to mess around tuning in 'the hidden stuff' on satellite transponders for years and now he gives away all of the trade secrets. Like finding network executive intercom audio channels, news-wire teletype channels, the Moscow-Washington 'Hot Line' RTTY and voice link back-up on Molniya and more mundane stuff like several dozen Holiday Inn 'Holidex'® 800-number reservation lines on satellite. He tells you where to tune in four different Anchorage, Alaska AM radio stations sent out via satellite, Alaskan flight weather, and hundreds more. PLUS - this manual is more than a clandestine sourcebook for the secret services. It includes dozens of step-by-step instructions for LNA and feed system operation, sub-carrier units, and a whole chapter on the latest Russian Molniya reception techniques. It even has a section detailing re-broadcast of satellite received channels via low-cost VHF television translators (including a look at such an installation). A section on trouble shooting your system; more than 20 chapter-sections in all! If you are into satellite reception, you need this new Coop manual. If you are thinking about getting into satellites, one look at this book and you won't rest comfortably until you too have your terminal up and running! The price is \$30 postpaid in US, Canada and Mexico; \$35 elsewhere. See order card to right.



③

Starview Systems Has ALL OF THE STARS COVERED!



NEW!!! Everything At Dish!

Starview Systems has teamed up with Robert Coleman to introduce the ultimate low-cost complete system. Shown first at SPTS San Jose, the full TVRO receiver (including LNA portion) mounts at the dish! Our 10R system has a complete 10 foot dish antenna, plus a remotely tuned receiver that is housed at the dish feedpoint. Just bring down the low-cost RG-59/U to your TV receivers. Here is a **complete** system that delivers NTSC re-modulated satellite signals on VHF channels 3 or 4. The price? A real breakthrough at \$4495! Find out more today.



NEW!!! Coleman 3742 Receiver!

Scan-tuned, multiple audio sub-carriers, local or remote control, superior threshold performance, full metering, double conversion of course. And available exclusively from Starview Systems. Ask about early delivery today!

LNA SUPER SALE - Continues!

Just \$795 for a top-of-the line Avantek 120 degree Kelvin, 50 dB gain low noise amplifier with the new 'power block' DC coupling system that allows you to use your TVRO downline for powering! Instant delivery on this top grade LNA at the unbelievable price of \$795!

STARVIEW DEALER SPECIAL

Get in on the ground floor as a TVRO dealer in your area! Starview Systems provides you with everything you need; professional instruction plus the finest mobile sales terminal on the road today. Included is a 10 foot Starview parabolic equipped with rotating feedhorn, Avantek 120 degree K LNA, top of the line Microdyne 24 channel tuneable receiver, 75' of coaxial and connection cables plus a trailer to get you to the demo site and operational in 30 minutes time. And the price? An unbelievably low \$7200!!!



STARVIEW SYSTEMS

H & R Communications
Route 3, Box 103G
Pocahontas, Ark. 72466 [501/647-2001]

COOP'S COMMENT ON PROGRAMMING

SPACE AT SAN JOSE

The Society (for) Private And Commercial Earth (stations) got off the ground very well at San Jose. The interim directors who volunteered at Miami were replaced with a new board and a set of officers that will do us proud in the battles ahead. Taylor Howard was elected President and there could not be, in my opinion, a better choice. Tay has every credential there is in the young industry; he's an engineer's engineer, a scholar, a fine public speaker, a 'name' person and a born leader. Plus he has Annie to see that he keeps looking ahead.

We now have some very serious problems confronting us. SPACE's General Counsel, attorney Richard L. Brown of Washington, D.C. managed to scare the pants off of me by bringing with him to San Jose an insider's copy of a new piece of legislation scheduled for introduction into the House of Representatives hopper about the time you read this. Among other things, this 'anti-piracy' bill makes it a horrendous crime to tune in any MDS, STV and satellite transmissions which you do not have written permission to access. The bill has apparently been steam rolled by a consortium of worried practitioners of the pay-TV trade; people who want stealing TV programs made very unattractive.

How unattractive? Try on a monetary fine of \$250,000 if you are an individual or \$1,000,000 if you are a corporation!

These guys are serious even if they are mis-informed and terribly mis-guided. They obviously have some clout in DC and they plan to use it. The bill is written so vaguely, according to Brown, that it could be interpreted just about anyway the enforcement agency that might get the bill as a tool wanted to enforce it.

In fact it is so vague that it could put every supplier in this business out of business overnight. Just like that. SPACE naturally has to fight it; to see that the drafters of the bill understand our positions and understand that there is a great deal more at stake here than ripping off 'The Seduction of Joe Tynan'.



As an innovator in this young industry I have long maintained, and stated at every available forum, that our problem with the program suppliers is not that we are unwilling to pay their fees, but rather that they are unwilling to accept reasonable fees (or any fees) from us. Since we have a mixed bag of free (no charge) services and fee-charged services on the same satellites (and same satellite) plus additional channels filled with private materials (such as pre-network feeds) it is apparent to me that if you have the permission to view PTL (for example) that others who don't want you viewing them should be engaged in some security system of their own to see that you don't watch them. I consider it very poor business for a corporation to lay out \$20,000,000 in their own cash for programming, and then stack it on the street car next to the free samples. I simply do not understand how they can expect it to stay there untouched. I wonder if these same people leave the keys in their cars and the car unlocked or stack twenty dollar bills on the doorstep outside their offices.

What HBO does with its programming concerns me not. I haven't watched an HBO movie in a year or more and I don't care if I never see another one. Even in a Holiday Inn. What does concern me is the worldwide lead that American ingenuity has taken in bringing satellite television technology down to the comprehension and pocketbook level of the common man. Tax dollars from **every** American citizen paid for the NASA efforts that led us to domestic geostationary satellites. Tax dollars support the NASA and Skylab launch facilities. I do not like the concept that only the HBO's and the RCA Americom's can use this technology. I have a lot of trouble with the idea that HBO can unilaterally **refuse** to accept private terminal viewers who **want** to pay for the service, and then stack twenty dollar bills on street corners and expect the US government to come to their rescue when they are pilfered. Susan and I spent nearly \$1,000 hiring private guards for the displays at San Jose because it was **our responsibility** to the exhibitors to do so. Can you imagine how long the seminars would continue if we opened all of the doors to the displays at night and walked away leaving them unattended?

This bill will kill the American lead in low-cost space systems technology. Taylor Howard will have to go back to teaching at Stanford. Bob Luly's Umbrella Antenna will end up as a backyard solar hot dog cooker. Avantek LNA's will shoot back to \$2,000 in a hurry. Everything thousands of people like you and I have worked on for years will go down the drain because firms such as HBO had the political clout to talk Congress into passing special interest legislation that is designed solely to do something HBO (et al) should be doing themselves. Talk about a government subsidy!

If you have not joined SPACE, **do so today**. Don't mess around putting it off. Get on the telephone and talk with Rick Brown (202-387-1856) and find out what you can do besides sending in a modest amount of money (\$25, \$100 or \$500 under the new dues structure). Low-cost satellite TV technology can truly change the world, in a positive way. Let's not let the 'big boys' pigeon hole this technology for their own private gain at the expense of the millions of people who made it all possible. The time to resist is now, today. Tomorrow may be too late.

COOP'S SATELLITE DIGEST (Programming Section) is published monthly by Robert B. and Susan T. Cooper doing business as Satellite Television Technology (Ltd.), P. O. Box G, Arcadia, OK 73007 (USA); 405-396-2574. **CSD** is not affiliated with any satellite programming distributor, hardware (equipment) manufacturer or distributor nor satellite systems operator. STT sponsors the Satellite Private Terminal Seminars (SPTS) held three times per year and does produce and distribute 'learning' materials and 'how-to-do-it' manuals relating to the development of the low-cost satellite TV receiving system industry. Subscription fee is \$50 (US funds) in advance. Canada, US, Mexico; \$75 (US funds) elsewhere. Copyright 1980 by Robert B. and Susan T. Cooper.

ATTRACT A CROWD? PUT ON A FIGHT!

There are a lot of ways to spread the 'good word' about satellite transmissions around; **Bob Behar** of Florida's **AB Electronics** knows about and has tried most of these. The June satellite telecast of the Leonard-Duran championship fight seemed to Behar to be another opportunity to promote public awareness of the applications of (low cost) satellite technology.

In Behar's view as long as he did not charge people to witness the fight via satellite, he was in no real jeopardy. The drama began however 72 hours before fight time when a Miami

businessman, Nathan Robert Rock, innocently asked Behar if a fully operational TVRO could be installed at his home in time for the fight. Behar accepted the challenge of putting in a permanent (as opposed to a trailer mounted) system in the short span of time. The basis for the agreement was a business contract; for an agreed to price Behar's firm would have a terminal operational in time for the fight, at Rock's home, or (1) Rock would not pay for the installation, and, (2) Behar swore his name would no longer be Robert Behar!

Behar considered the challenge just that; a challenge. First he arranged with a Miami machine shop that builds customized bases for the Behar chosen 16 foot Paraframe antennas to get a motorized polar mount turned out in well under the 72 hour timeframe. Next Behar marshalled his forces including Jesus Iguanzo, Nelson Enriquez, Heriberto Arencibia and Ruben Behar. A twenty-four foot U Haul truck was leased to move the 1200 pound 16 foot antenna plus the 1500 pound customized polar mount. Following a terrestrial trip to the North Miami location Behar's first major problem cropped up; in his judgement the only possible 'good location' for the 16 foot dish would be squarely atop a beautiful, mature grapefruit tree which the family had cherished for years. A test of Behar's diplomacy followed; Mrs. Rock arguing for her grapefruit tree, Behar on the side of the 16 foot dish. It took 30 minutes but Behar won and before Mrs. Rock could change her mind about the relative advantages of satellite TV versus fresh grapefruits Behar's band of merry satellite installers had the tree down and cut into fragrant cord wood.

It took five hours to assemble the satellite dish and the polar mount. It was at this point Behar's crew realized there



PART OF the outdoor crowd of 600 watching the Leonard-Duran Championship Fight on one of the outdoor monitors set up by AB Electronics. Antenna is 16 foot Paraframe with AB designed fully steerable motorized mounting system.

was no way to lift the 1200 pound antenna to the polar mounting support plates. Now finding a crane to come out at 8 o'clock at night is no easy trick; again Behar improvised by locating a friend with a wrecker who had a 16 foot boom to lift with. Again there were new problems since the boom was not quite long enough to get the antenna fully onto the mount but with the wrecker doing most of the lifting Behar's crew somehow managed to get the dish onto station at midnight.

The next day the crew returned to complete the installation and hook up the electronics. By 10 PM the second evening Behar had checked the motorized 16 footer out on 10 different satellites including INTELSAT service from Brazil. The antenna and mount were, at this point, only semi-rigid since Behar had wanted to be sure that terrestrial interference was not going to be an unpredictable problem at the site. So on the Friday morning of the fight a concrete truck arrived with a load of wet stuff to secure the mount in position while Behar and his crew ran remote control lines to allow Nathan Rock to change satellites and feed antenna polarization from the comfort of his living or bedrooms. Behar's crew was just finishing up the final touches when Rock's guests he had invited to the fight began to arrive.

For Behar the challenge was met but the day was still young. Hauling his crew back to his Hialeah AB Electronics plant site they proceeded to set up five television receivers throughout the facility connected to another 16 foot dish installed at the AB facility. Behar had decided earlier that he was going to be able to locate the fight on the bird and had in fact sent out press releases and a general invitation to anyone who wanted to attend the fight "free" to drop by his AB plant location.

Several thousand did so, filling the streets and the facility around the AB location to an overflow capacity!

Publicity for Behar's operation was phenomenal. Advance publicity prior to the fight sold three elaborate installations in the South Florida area. Coverage in the local newspapers plus additional coverage by the local TV stations brought in orders for another 18 units within days of the championship fight. Behar believes 'fall out' from this exposure will still be selling terminals for him a year after the championship fight. Of course not everyone (if indeed many at all) of those who packed the streets and alleyways around 1783 W. 32 Place in Hialeah are able to afford Behar's space age system. AB prices start at \$4995 for a 10 foot system and climb upwards to \$16,495 for a fully steerable 20 foot system. But one thing is for sure - Behar established his firm as 'the supplier' of satellite hardware in south Florida with this promotional 'stunt' and by doing so he



TRADE - One family cherished grapefruit tree for a 16 foot satellite antenna that brings in 10 satellites? Sold!

will be doing big business in not only south Florida but through the Caribbean, central and South America where Miami influence is felt.

S.P.A.C.E. LAUNCH SUCCESSFUL

SPACE PROGRESS AT SAN JOSE

The Society for Private And Commercial Earth terminals (S.P.A.C.E.) announces the following results of its multi-program approach during the San Jose SPTS gathering.

1]President of SPACE is H. Taylor Howard, pioneer developer of low cost satellite TV receiving system hardware and Professor of Electrical Engineering at

Stanford University.

2]The Board of Directors is as follows:

- a) William Asip, Asip & Associates, New York, New York
- b) Robert M. Coleman, Travelers Rest, SC
- c) Bob Cooper, Jr., Arcadia, OK
- d) Sam Conwell, SES of N. Virginia, Inc., Chantilly, VA.
- e) Gary Deane, Starscan, Houston, TX.
- f) Bob Dunlap, Private Satellite Television, Inc., Charlotte, NC
- g) Royden Freeland, International Crystal Mfg. Co., Oklahoma City, OK
- h) Gerald Logue, Calgary, Alberta
- i) L. Russell Keene, II, Sulphur, LA.
- j) Clark Mihelko, Fallbrook, CA
- k) Ray Miller, Satellite Services, Inc., Burnsville, NC
- l) Ralph Payne, Hubbard-Payne, Inc., Knoxville, TN
- m) Arthur Terwilliger, International Microwave, Cos Cob, CT

3)SPACE now has 150 members (up substantially at SPTS San Jose) but Rick Brown, General Counsel and VP urges those who have not joined to do so immediately. Under the new dues structure adopted in San Jose, individual annual memberships are \$25, corporation annual memberships are \$100 and sustaining membership (which includes the placement of a representative on the Board of Directors) is \$500.

The most immediate concern of SPACE (and indeed all persons and corporations concerned about the future of low-cost satellite TV technology) is the Congressman Preyer (NC) bill, **HR 7747**, introduced into the House hopper in mid-July. This bill attempts to legislate the question of 'piracy' of common carrier signals (including MDS and quasi-carriers such as STV) and makes it a fineable offense (\$250,000 to \$1,000,000) for the interception of such signals without approval of the carrier. SPACE's Howard and Brown spoke out in San Jose urging attendees to join SPACE and to lend their **immediate** support to helping educate Congress about the built-in differences between MDS, STV and direct (home) satellite reception. Brown noted "If this is going to be an industry that offers to rural Americans their first real opportunity to have multi-channel television, something they have been denied to date, we are going to have to get Congress to recognize that rural Americans must have the right to access satellite services. Without that clear definitive difference, satellite reception by private individuals is going to be swept up in the emotionalism surrounding MDS and STV piracy and this industry will die before it is born".

You can obtain full information about SPACE and HR 7747 from Rick Brown at SPACE, 1521 O Street NW, Washington, D.C. 20005 (202-387-1856).

FINDING HELP

GETTING STARTED FRUSTRATIONS?

You say you are having problems getting started in business? That everyplace you turn you end up further behind than when you started? You say you wonder if this industry is really going anywhere?

Here's a letter, abbreviated in the name of getting to the 'bottom line' of this chap's problems, and our public answer to same. The writer is Jim Beckett and the firm is CFP Enterprises. Perhaps Jim's mistakes will help you avoid a few of your own.

"As far as TV is concerned, I have run the gamut...from installing antennas as a kid and then doing a hitch in the Army as a field tech and microwave tech and then later as a Univac tech and a cable TV tech. More recently I was President of a firm called CFP Communications, Inc., a retail amateur radio 'store'; which bit the dust this year out of the pure desire not to lose money.

"(To get started in TVRO work) I placed an advertisement in the Ham Trader, looking for dishes. I got some response and ended up swapping some left over ham gear for two surplus 10 foot dishes. Then I spotted Andy Hatfield's advertisement that he was looking for dealers at AVCOM and I called him. When I mentioned my ten foot antennas, Andy offered credit against PSR-3 receiver and I took the ten footer to his home...and waited (eons) for my PSR-3. When the receiver arrived I set up the system (SCI 120 degree LNA) and had lousy reception. I checked the LNA; OK. Checked the receiver; OK. What was left? The dish!!! I hauled my receiver and LNA over to Clyde Washburn's house and it worked fine. Nuts. I had a warped dish.

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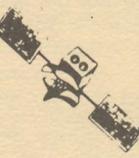
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"Than I spotted Jim Vines's advertisement and decided to make a deposit on the Vines Parafame antenna. Finances were tight however so I found somebody looking for a fancy receiver although that left me without a receiver. However as luck would have it I ran across a fancy HP gigahertz range signal generator which Clyde Washburn needed so I managed a 'swap' between the surplus signal generator and a wired and tested Washburn receiver with Clyde. Now I had the money to deal with Jim Vines on a Parafame.

"Why did I sell the AVCOM? Well, since becoming an AVCOM 'dealer' I have received zilch from them. Not a single shred of paper. And what is worse, no technical information at all; not even a engineering manual for possible field service. Having dealt with large manufacturers, I am used to good manuals and information."

Coop's comment. I have a problem with you being a dealer by buying **one** of anything. I have a problem with **anyone** being a dealer with one of anything and that includes the Parafame you bought. There is a real problem in this industry right now with people representing themselves to suppliers such as AVCOM and Parafame (to name the two you mentioned) as dealers when in truth they are either (1) only trying to chisel the price down to get a discount for their own **private** use, or, (2) as in your case not really ready yet to qualify as a dealer.

I have been advising our CSD advertisers **not** to advertise price unless the price they advertise is the end user suggested list price. Why? Because we have a mixed readership of end users, people who want to be dealers, people who are dealers and so on. Anytime a price lower than one-quantity pricing is published, people just naturally want to buy at that (lower) price. That's human nature and thrifit. But no manufacturer can exist in the marketplace very long when people buy in single quantities at the 100 lot price.

I doubt Andy Hatfield felt you were really a dealer. I think he made his first mistake by agreeing to sell to you as if you were one, before you had **established yourself** as a dealer. You got out of the amateur business because you couldn't make any money at it. Why? Because hams have forced pricing on most amateur gear so low that a dealer can't make it anymore.

I think you will find that when you act like a real dealer, you will be treated like one. Not you in particular; just anyone who thinks they are going to make a pot of gold in this business.

The truth of the matter is what you buy for is almost immaterial. There is no competition at the retail level yet in most areas; you can sell an installed terminal for several times what you will buy the antenna, receiver and LNA for. Folks like Bob Behar in Miami and Chuck Colby in California (to name just a pair) find no resistance at the \$10,000 - installed pricing level. When you cut corners you cheapen the product and pretty soon cutting corners becomes a way of life. And that's a bad deal.

So what is a dealer? I like Royden Freeland's posture at ICM. **He has no dealers and no distributors.** Anyone who comes in the door and wants one radio pays the retail price. If you buy ten or more you get a price discount. Buy 100 or more and you get another discount. You earn your discount based upon the quantity you buy, not because you cloak yourself in some dealer coat. And we think that is the way it should be.

Jim continues "It is one thing to publish an advertisement and give flowing praise to a product and another thing to keep your readers aware of problems. It appears now I would have been better off with less wasted time to have dealt with SA, Microdyne, Anixter...just to name a few. Maybe the cost would have been greater, but the quality (of the products) would have been better and the performance would be there. And time wasted is money lost. I would not really advise anyone to go to a 'small shop' until they had made a real check on them. And that is difficult to do; right now it is all by word of mouth. CSD is in a position to advise readers to be careful when dealing with

these new outfits. And I wish you would".

Coop's comment. There is a lot of room for improvement in all parts of this industry, we included. The early television market, in the 40's, was filled with kits and do it yourself products which loaded the pages of **Radio Electronics** and the old **Radio-TV News**. Then as manufactured gear became more plentiful and less expensive the incentive to do it yourself went away. The same thing is happening in this industry now. Like any field there will always be incentive to do it yourself if for no other reason than the pride that goes with doing something with your own hands. But our economy in North America is not geared to that philosophy (sadly perhaps) anymore; we have become, just as amateur radio has become, a population of button pushers and appliance operators. During SPTS in San Jose we met with several attendees from Canada who had been victimized by a firm operating out of Oregon calling itself **Cascade Electronics**. This firm apparently did some advertising offering TVRO modules (LNA modules, receiver modules and the like). One Canadian we talked with had 'lost' nearly \$2,000 to this firm which either never shipped at all or shipped true junk. We got to talking with H. Paul Shuch about this at San Jose and Paul said yes he had heard of this rip-off firm and had even noticed that many of the modules this chap was selling were copies out of various magazine articles that Paul had written as far back as five years ago. One IF passband filter module from this Cascade Electronics which purported to be centered on 70 MHz and 30 MHz wide was constructed with torroid coils that are simply not capable of that type of passband at 70 MHz. True junk, and here were several Canadians at SPTS (plus who knows how many others) who had been victimized by this firm.

Jim continues "I enjoy the Digest very much as it is very informative and the information isn't available anywhere else. The only thing I can pick on is that I think we have seen enough on the Russian satellites in print...I have no desire to learn Russian although they might start using English someday!"

Coop's comments. We've had a few letters suggesting Molniya has been worked to death. I disagree although unless there is a major change in its operating parameters we won't dwell on it much in the near future. We are reminded that Tay Howard suggested to us that he would go home (from San Jose) and look for Molniya, just to see if he could make it play on his 15 foot dish. But he didn't think he would be watching it much. After he found it he changed his mind. You cannot imagine what kind of trivia the Russians are fed about America and the balance of the non-Soviet-aligned world via Molniya. I maintain that if we could somehow force US Senators and Representatives to sit down to watch just 60 minutes of Russian television, via Molniya, we'd have a whole new ballgame in Washington. In our view, Molniya may not speak our language but in watching it you quickly develop a new sense of pride in our American system. Heaven knows we are not perfect but at least we have the opportunity to **admit** we are not, as we are doing here!



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SPECIFICATIONS:
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Motorola MWA-230	600MHz, 10 db gain, +18.5dbm	13.50
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Motorola MWA-320	1GHz, 8db gain, +11.5dbm	13.50
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Regulators: 7800 Series	5V, 8V, 12V, 15V, 1A TO-220	1.50
Regulators: 7900 Series	.5V, -.8V, -12V, -15V, 1A TO-220	1.75
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- (D) Dual (2 channel) Audio - \$25.00
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- (E) AEC and Metering - \$15.00

These field proven and tested high quality boards are available as a five-board-package for \$99 package price (you receive A,B,C,E and F above). Included is complete documentation for construction and a list of parts stocking distributors.

Order from: Robert M. Coleman, Rte. 3, Box 58-A
Travelers Rest, S.C. 29690

DEAR COOP

Because Coop is so hard to get on the telephone (some would say impossible!) we encourage people who feel they need some information he has filed away to write. Several hundred such letters arrive each week, many are answered with a note penned across the bottom often by hand. It is simply far more expedient to go through a stack of 50 letters or so at a time dashing off a quick response than it is to constantly get up and down from the typewriter or a videotaping session (bringing everything to a halt) to answer a telephone call. No big deal...that's just the way it is.

M. Rejean Mathieu of Baie James, Quebec decided to write a letter. He set a record...36 handwritten pages! After the shock of opening the huge envelope had passed and an hour was spent deciphering Jean's handwriting it became obvious that no quick note dashed along the bottom of page 36 was going to do justice to this monumental effort.

Jean attended SPTS '80 Miami and many of his questions and concerns stemmed from that experience. Let's see what's on his mind because chances are some of what he thinks about may be on your mind these days as well!

"I disagree with your way of running the seminars. With two sessions going on at the same time there is no way to catch everything. Perhaps some sessions could be run in the evening?"

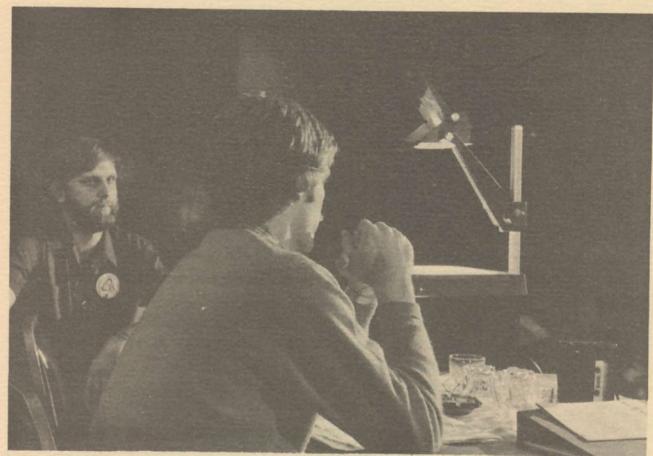
We run twin or parallel sessions because we recognize that not everyone is an engineer or even cares what happens to the electrons inside the LNA; so we attempt to schedule high-technical and either non-technical or semi-technical sessions at the same time. In this way a chap interested in getting into this business for profit can attend the not technical sessions while perhaps his technical partner can attend the high-technical sessions.

"Where was Coleman's active mixer? I wanted to see it work, to see a live demo of it with an IF and a demod so we could compare the pictures."

Coleman had it all with him but he couldn't find antenna that would accomodate him. He did bring with him a super home-made videotape of the system in operation and we announced (and Bob displayed) that tape several times, especially on the second day at Miami. Sorry you missed it.

"Where was the Swan antenna? Where was Birkill? John Kinik of KINTECH, NEC, VARI-L, Englemann, Vitramon, Rogers Duroid, etc?"

With Oliver Swan's death there was no way Oliver's widow could get an antenna to Miami. However the spherical designed by Hayden McCullough (the '8 Ball Antenna') was up and operating in San Jose and there was be a BIG (or should we say 'little') surprise in this product area. Steve Birkill works for the BBC in England and while we did bring him over to a conference in the summer of 1978 (see separate report in June issue) there is no way he can get away very often. We hope to get him back at a future SPTS and when we work it out, you'll know about it far in advance here. As for John Kinik (he was at SPTS '79 in Oklahoma with his antenna 'kit'), here's a story that will curl your hair. John was working for Philco-Ford in their satellite division during the summer of '79. On his own,



SINGLE CONVERSION technology session featured CSD authors David Barker [GHZ Engineering; left] and Norman Gillaspie [right]. Gillaspie also covered NEC powered LNA designs. [SPTS San Jose]

with his own money and in his own spare time, he developed the Kintech antenna kit that we have written about and described in videotape. After the SPTS '79 show his employer discovered what he was up to and they called him on the carpet. In short they advised him that his 'written contract' with them included a paragraph that stated that ANYTHING he developed while working for Philco-Ford belonged to them. John ended up in court, he lost his job, and Philco-Ford got an injunction prohibiting him from marketing the antenna. And as for that long list of microwave hardware suppliers...well, apparently you have missed the on-going message in **CSD**. Microwave parts suppliers (with the possible exception of Avantek and DEXCEL) don't want anything to do with us! They don't understand this market, don't want to hear from you or me, and certainly would not appear at SPTS. To them this whole thing is very un-microwave! Need it spelled out clearer? They are in the dark ages and believe that the microwave region is only for super-sophisticated types laboring away in pristine laboratories.

"The ham net on 14.311 on Sundays is too short. I would like to find other Canadians who can move down below 14.200 after the net is over to carry on."

Good idea. How many Canadians want to join Jean? His call is VE2EUI.

"Looking through a voltage regulator manual I spot the 723 IC regulator which has much better line and load regulation specifications than the 7800 or 7900 series regulators. What do you think?"

Most of the PLL receiver designs utilize an AFC that has a minimum range of +/- 5 MHz. Stiff regulation is not a problem with the AFC working and most people get up and change transponders every now and again anyhow; unlike CATV systems which dedicate a specific receiver to a specific transponder and just leave it there fulltime.

"What are the techniques for soldering chip capacitors?"

Do it carefully. Bob Coleman has a large stand-mounted magnifying glass which he places the board under and then he works with plastic tweezers and a small (25 watt max) iron.

"Please run some articles in CSD on how to hook up cheaply multiple receivers to a single LNA/antenna for simultaneous reception from several satellite channels."

No trick to this; just install a hybrid splitter (try Merrimac in West Caldwell, N.J. - listed in January 1980 **CSD**) for a single input and then 2, 4 or 8 outputs to discrete receivers.

"One guy selling antennas had a commercial LNA looking at the dish surface and there was no feedhorn on the LNA. He told me there was no loss of signal whatsoever. That told me what you have written repeatedly; i.e. that a lot of this engineering crap we get shoved down our throats by the so-called professionals is just so much %*&*!."

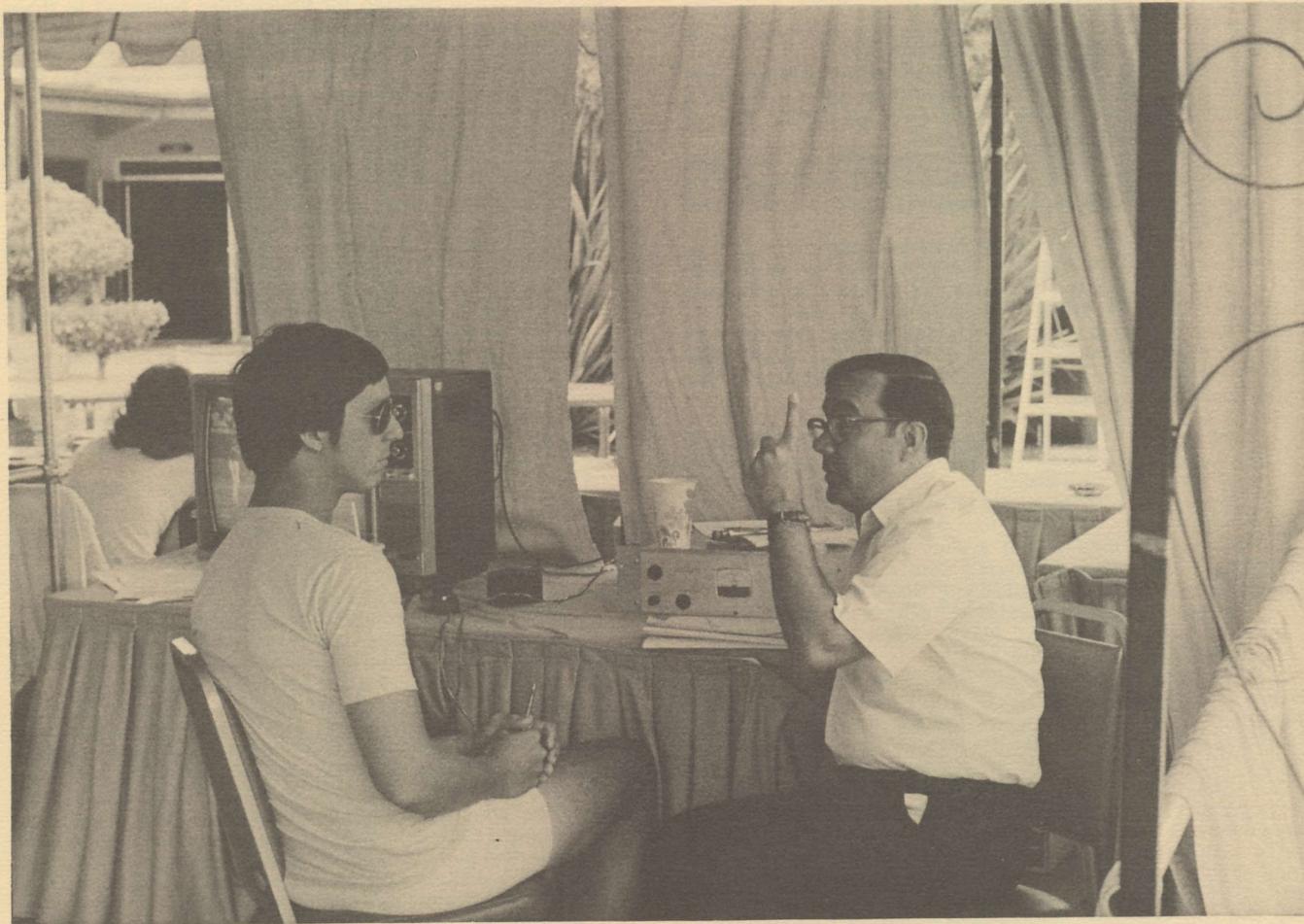
The fact is that you **can** get pictures without a feedhorn on a typical commercial LNA that has an input cavity feed and a pickup probe inside. But to state flatly that a feedhorn makes **no difference** is **not correct**. The flange on the LNA is really a section of waveguide with an open mouth. If you look closely at some of the prime focus feeds available on commercial Prodelin dishes, for example, you will notice that they have a questionmark (?) shaped feed with the top of the curly-cue directed back at the dish surface. This is an open hunk of waveguide, sometimes flared slightly, and it is a feed. However this open end has a 'pattern' like any other pickup antenna and that pattern must properly illuminate the dish surface. Most feed designers attempt to illuminate the dish from 10 to 15 (-10 to -15) dB down reference the 'boresight' or center of the pattern. A commercial LNA flange **without** a feedhorn attached is apt to be a long ways from -10 to -15 dB (down) at the edges of the dish; more like down 30 or so. This says you end up, without a horn attached, illuminating only the central portion of the dish with the particular f/D ratio of the dish and you lose signal. The actual **system loss** may amount to -3 to -8 dB in **carrier** level. If you could really pull the feedhorn off and still have 'perfect pictures' (i.e. "It doesn't make any difference..."), to the eye, because the additional loss of the system without the feedhorn still results in pictures that are above sparklies), this would simply tell you that you originally had an excess signal 'margin' above the amount of loss encountered by removing the feedhorn.

On our STT 20 foot dish (a USTC prototype that probably works more like a 16 footer in today's world) we can take off the feedhorn and from sparklie-free pictures we go to signals 2 to 3 dB below threshold.

"I have heard you say and have read from CSD that the

parabolic antenna efficiency is around 50-55%. Can we have an article that explains what is involved in making a dish more efficient [or less efficient if you goof!]. My thinking is that if there are ways to increase the efficiency of the dish to say 60 or 70% that this would be a worthwhile area to explore rather than to continue to be married to these expensive LNAs."

That's a tough one to answer in short form. Briefly, the **feed** is the primary culprit. Remember that designers try to get the edges of the dish down 10 to 15 dB relative to the center of the dish. This is done to achieve a sufficiently narrow 'pattern' on the antenna system as a whole to insure that you [1] can distinguish **between** birds that are parked at 4 degree increments, [2] do not 'see' the earth behind or to the side of the dish with the feed since the earth is a 300 degree K noise source and if you 'see' too much of it with your feed you end up establishing a system noise floor which will be 300 degrees K **no matter what LNA** you put on it. So there are 'trade offs' in antenna efficiency for antenna pattern. There is one antenna design called a Cassegrain which requires the installation of a sub-reflector at the normal prime focus feed point (not precisely there but in that general area). This sub-reflector re-directs the dish collected energy back towards a feed located in the exact center of the dish which is equipped with a horn of special design that 'sees' the sub-reflector. Such a dish can routinely increase system gain by 1 to 1.5 dB over an antenna of identical size utilizing a prime focus feed. So why doesn't everyone use a Cassegrain feed? The mechanics are very expensive; tooling for the sub-reflector must be extremely precise (you don't batter one out of an old hub-cap!) and precise means expensive. The SA Commercial dishes take this approach but others in the commercial field think that



TED SPILLERS [left] of STAR gets the straight scoop on which way is 'up' from STT's Satellite Navigator Steve Gibson.

ultimately they will figure out a way to improve the efficiency of the prime focus feed to match or come close to the Cassegrain.

"Since LNAs seem to be prone to voltage surges from lightning and line-switching-transients, I know that mine will never be connected directly to any type of supply line [DC or AC]. I intend to use rechargeable Nicad batteries with a small trickle charger supplying voltage to the batteries. I would also use many sections of LC line filtering and if one is to believe General Electric in their 'Transient Voltage Suppression Manual' I would also use MOV [metal oxide varistors] across the AC line to the charger, from each side to ground, on the AC secondary both across and to ground and on the DC supply lines going to the battery system. Maybe I am overly cautious but these darned GaAs-FETs are the 'fastest gun in the west'!"

True, true, true. Commercial LNA suppliers have learned a great deal about protecting GaAs-FETs through the ten thousand or so LNAs now in service in this field worldwide. MOV devices, fast rise time voltage regulators and a whole bag of tricks are employed. A GaAs-FET is aptly described as a **very fast fuse**. It does not like spikes or surges or transients and it will 'zap' in milli-seconds. We do exactly what you suggest; run our LNA off a DC battery supply, trickle charge it with a 200 mA charger and MOV the system to death. We have never lost an LNA to switching or transient surges nor to lightning.

"How come Microdyne has single conversion TVRO receivers in their highly rated commercial line and Paul Shuch stomps up and down with indignation anytime somebody suggests single conversion is viable?"

Microdyne gets away with single conversion because they

have designed a high quality 'tracking filter' that hangs across the input to their receiver(s). This effectively insures that the 'image' frequency is eliminated (or put so far down as to not be a problem). Tracking filters at 3.7 to 4.2 GHz are expensive gadgets; and they require great patience and lots of test equipment to get right (i.e. align). They also add input circuit loss (i.e. increase the noise figure) which in the earliest Microdyne receivers (i.e. such as the 1100 TVR) was compensated for by installing around 20-25 dB of 'pre-amp' gain in the 3.7 to 4.2 GHz range. **This gets to be a hassle; first** you decide not to double convert so that means if you can't stand images that you have to have a tracking filter. But the tracking filter **adds** input noise figure because it has loss so you then tack in a relatively high technology pre-amp. Microdyne makes excellent radios; we've had an older version for years and in spite of its battleship complexity we have had good service from it. But nobody could ever work on it unless they were trained in the specific Microdyne alignment and trouble shooting techniques and had the special test jigs it requires.

We said several issues ago that somebody would do right well for themselves if they were able to develop a low-cost, easy to align, reasonably priced 3.7 to 4.2 GHz tracking filter. The challenge still exists and when somebody does it all of the best arguments for double conversion radios will go away!

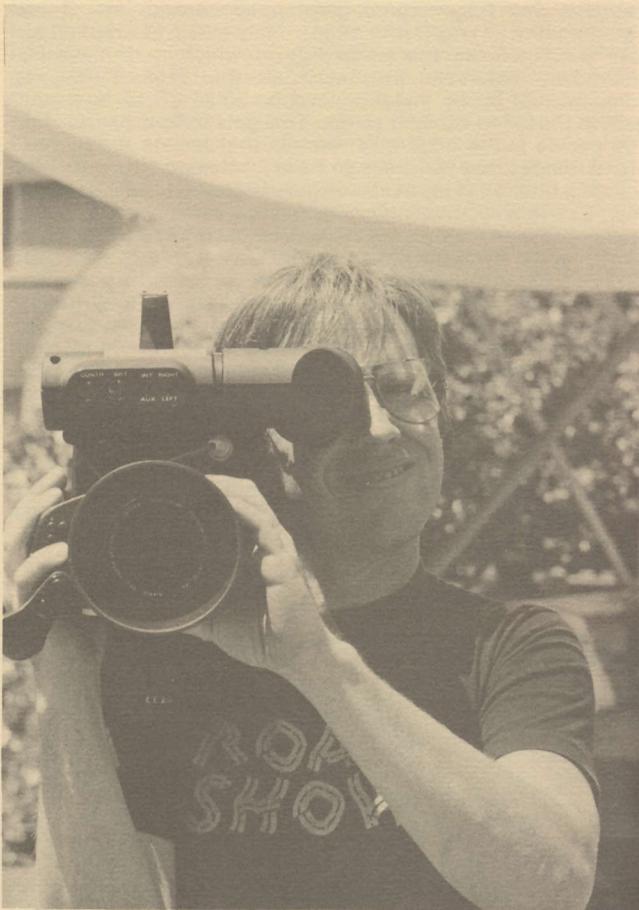
"On page 11 of the Howard Terminal Manual it mentions that some modifications are required in the Howard Terminal LNA board for the Airtech bi-polar transistors [when substituted for the HP devices]. What are those mods?"

Forget it. Airtech announced lower (than HP) priced 6101

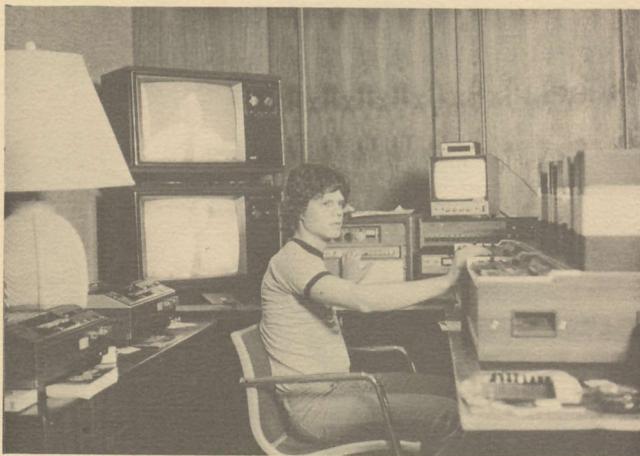


INVASION FROM SPACE - Imagine stepping out of a time machine onto the Hyatt pooldeck area and finding large 'mushrooms' growing all around!

and 6102 type bi-polars last summer and then withdrew them from the market claiming there was not enough market out there for them to keep them in the line. We figure that is



ON RECORD - ACE TV's Dana Atchley, III and his crew created more than 30 hours of new videotape during SPTS covering the seminar meetings and the outdoor and exhibit events.



SPTS TV CONTROL CENTER - Gary Willhoite holed up in a 'secret suite' at the Hyatt for four days and cranked out more than 70 hours of pre-recorded programming on VHF channels 8 and 9 to the hundreds of attendees who either watched or videotaped to take home with them the events of this and past Seminars.

hogwash; they probably didn't have them figured out in the first place and never should have announced them at all.

"How can an orthocoupler be built so a terminal can receive both polarizations at the same time without having to rotate the feed?"

For the unwashed an ortho coupler is a 'beam splitting device' that installs at the feed between the feedhorn and the LNA. It may have a feedhorn built into it. What it really does is separate polarizations into two separate 'ports'. It does this by utilizing carefully positioned and sized metal 'vanes' that insert into the feed cavity. Thus it has one input (from the parabolic surface) but two outputs (one for vertical and one for horizontal). Onto each output you attach a separate LNA, run a separate line for each to the receive location and either employ a pair of separate receivers or a 3.7-4.2 acceptable coax switch to select between the two feeds.

We have never seen a build-it design on one (**anyone want to send one along?**); know that the commercial couplers cost from \$300 to \$900 each and really believe that since you have to at least have twin LNAs and twin downline runs that it is not a very practical approach for the typical private terminal.

"In the October CSD on page T7 you talk about 'C to N' and 'S to N'. What is this all about?"

C to N (more appropriately C to N + N which is carrier to noise plus noise) and S to N are the two measurements done to proof a terminal. C to N relates to the ratio (in dB) between the incoming carrier from the bird and the noise of the system. This is a measurement done most appropriately at an RF (i.e. non-baseband) point in the system. S to N is signal to noise and in this application it relates to the video (baseband) ratio between video voltage and noise voltage.

A C to N ratio, measured with a power meter device, in the 10 to 15 dB region is considered about right; the lower the ratio (i.e. 10 here) the less 'margin' you will have. The typical receiver (not the LNA; the receiver) has an 'FM threshold point' in the 11-13 region. In effect, this is the point where if the carrier is equal to or greater than this 'threshold point number' you will be just out of sparklies. That means that if the receiver has a threshold of 11 dB you must have a C to N of **at least 11 dB** to be 'above sparklies' (i.e. no perceptible noise in the picture). The difference between the C reading, above and beyond the receiver's threshold point, is called 'margin'. If your receiver has a threshold of 11 (dB) and you have 14 dB of carrier present (as measured with a power meter) then you have 14 - 11 or 3 (dB) of 'extra' (excess) signal; your 'margin'.

The S to N measurement is done at baseband by connecting a scope or waveform monitor to the video output. You use some weighting filters to arrive at the right measurement criteria, align the peak video voltage level across a reference line on the scope display and then crank out the signal and measure the 'noise floor' of the system. The difference between the two is the S to N.

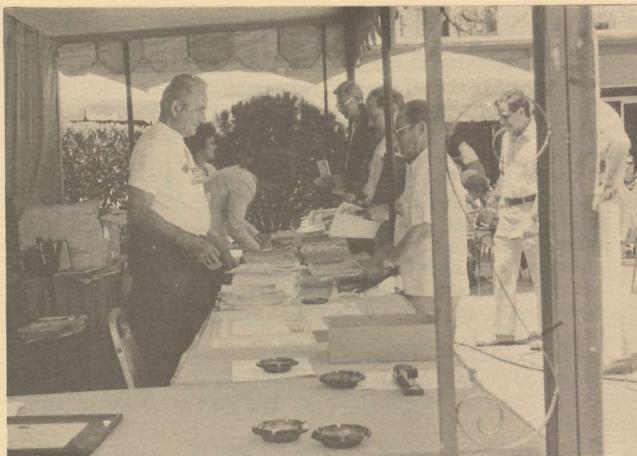
In the commercial world an S to N of 48 dB is considered 'CATV quality' video; that means it looks darned good. But broadcasters won't accept a feed that is 'this shoddy'; they insist on having 51 dB video signal to noise as a minimum before they will use the signal for re-broadcast purposes. The terrestrial Telco links do it one better; they want to see 54 dB S to N in most cases before they consider the signal passable.

A 48 dB S to N has no perceptible noise in the picture. But (depending upon the monitor and some other factors) when you drop below 48 dB by a dB or so you will start to see 'grain' in the picture (i.e. fine grade noise). A S to N of 46 dB is still a pretty decent picture and 90% of the people would look at it and rave. The other 10% would say there is 'perceptible noise' present.

"Did Coleman try using his TD-2 mixer right at the feed horn or did he use the open end of the TD-2 as a 'horn'? What kind of results did he get?"

He tried everything he could think of including building a Cassegrain sub-reflector out of a discarded dishpan! The TD-2 'flange', like the LNA flange, will act like a feed of sorts but as previously explained it will not properly illuminate the parabolic surface so there is loss that should be avoided here.

"I intend to build the Howard Terminal receiver all in one box and then when it is operating properly put the dual conversion board into an insulated box with a



RICK SCHNERINGER at the STT booth saw to it that 600 + attendees and 35 exhibitors co-existed peacefully through the four day event.

heating system and thermostat and install it out at the dish. Is the Richardson thermostat system described in CSD for February 1980 [page T13] adequate for this purpose?"

It is. The primary reason why somebody wants to install the downconversion system at the antenna is to escape the feedline losses at 3.7 to 4.2 GHz. Or the expense of reasonably high grade coaxial cable.

If the coax run is going to be in the 40-60 foot length class, and if you will have 35 dB or so of gain at the LNA, some receivers (Washburn, ICM for example) will run well with just RG-9/U or RG-214. There is a trade off here; you can use less expensive coax (i.e. less than 1/2 or 7/8ths inch hard line / Heliax®) provided you are either willing to use a short run of coax and/or an LNA with more gain. The ICM receiver, for example, uses the Shuch 'balanced gain approach' which means that with 30-35 dB of gain at the LNA, the same amount at 1200 MHz (the high IF) and about the same amount at the lower IF (70 MHz) the 90 dB of system gain required for proper performance is met. In fact, if you put **too much LNA gain in front of an ICM receiver** the unit goes crazy and produces poor pictures. Shuch designed it this way so that a fellow could save money with his LNA buy. Washburn took a similar approach in balancing his gain while others such as AVCOM design around a 45-55 dB gain LNA.

"I must have read the Coleman Manual over and over to figure out where he is talking about the bi-polar and where he is talking about the GaAs-FET LNA boards. Is the PC layout at the top of page 12 for a GaAs-FET LNA or for the bi-polar described on page 10? Or is it for the GaAs-FET on page 11? On page 11 the third paragraph says 'The HP schematic show...'; what HP schematic?"

Sorry about the confusion. It goes much deeper than you indicate. Bob Coleman's approach to the LNA has been to simply take the HP layout (appears on page 12) and plug into it either bi-polar transistors, or GaAs-FETs. Bob will tell you that he has never attempted to **optimize** a board for GaAs-FET; he simply utilizes the same board for whatever device he wants to experiment with.

Others will tell you that you **cannot** do this and expect to learn whether a particular NEC or Mitsubishi or whatever GaAs-FET device is in fact suitable or better than what you started out with. The (S) parameters for the various GaAs-FETs vary from device to device. These are the parameters which characterize the GaAs-FET and with which you work out the optimum etched-on-board dimensions and physical configuration for the system you are building.

We published one man's approach to optimizing GaAs-FET LNAs in the May CSD; see page T10 and the report by Kenneth Rae. This experimenter rigged up a low-cost swept display system to allow him to play around with the circuit loading to achieve an optimum performance balance

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within a stage and between stages. The best approach if you are equipped to do it is to run the S parameter numbers through some complex equations and end up with the exact recommended physical dimensions for the particular device on the board; and then proceed to build the board that way. Paul Shuch covered this in his SPTS presentations in Oklahoma City and Miami quite well; another person who does this routinely and who seems to do it well is John Rohner of **Rohner Machine Works** (7th and Elm Streets, W. Liberty, Iowa, 52776). John is a very adept computer programmer and he has worked out various programs to allow him to compute design boards for various LNAs and whatever.

The bottom line on building your own LNA is this. **Even if** you start out with a circuit board that has been designed utilizing S parameters for the particular device you have chosen, you stand less than a 10% chance of getting peak, optimum, performance with the stage (or stages) **unless** you are willing and able to go in as Kenneth Rae does and tweek and carve and play with the stage. Virtually any board available (including the much-duplicated HP application note board utilized by Coleman and as appearing in the Coleman and Howard Manuals) will provide **some** gain with almost any 4 GHz rated device. **BUT** - optimum gain (say the difference between 6 dB and 10 dB) and optimum noise figure (say the difference between 2.0 dB and 1.2 dB) will come only by tweeking as Rae does. If you happen to hit it right off the bat, you should kneel down and say a silent prayer. It may never happen to you again.

This is the **BIG** reason why commercial LNAs are holding their \$800-\$1200 price tag these days even after GaAs-FET transistor prices have dropped from \$300 each to \$50 or so each; the commercial units are hand tweeked and that requires \$20,000 in test equipment per tweeking station and **sometimes** hours of tweeking time by highly paid, professional people. When some enterprising LNA manufacturer figures out how to 'automate' this function, then and only then will LNA prices

really come down to where they ought to be!

"Please advise me where I can locate scrap Telco gear such as the TD-2 or dishes in Canada. I was told by a telephone engineer that when this stuff is taken out of service they send it to a scrap yard where it is all melted down for bulk metal."

That's one way to keep their technology a secret. Hitler burned books; the Canadians burn microwave equipment!

"In the March CSD it mentioned the booths of Avantek, SCI, and DEXCEL. I must have gone around the exhibit hall 100 times and I never did find SCI. How come?"

SCI is Scientific Communications, Inc.; they are now owned by Gardner Communications Corporation in Houston, Texas. Their booth was called STARSCAN which is their corporate name for their private terminal sales division. SCI's Tom Humphries appeared on the program as did big-boss Clifton Gardner. We thought they were hard to miss; certainly there were lots of SCI products laid out in the STARSCAN booth.

"Your manuals and CSD have a poor binding system; they fall apart in no time."

Good grief. They are NOT bound on purpose. We know because we have been doing this sort of thing for twenty years or more that publications like these are used and used and re-used hundreds of times each. No binding method known to man would hold up to this. So Coop made a decision going in that he would three-ring (hole) punch the manuals and CSD so the user could insert them into a standard binder. In this way they will hold up for a much longer time. The bronze colored brad is simply to hold them together until they arrive to you; after that, you should put them into a three ring binder of your own choosing.

"In the April CSD, page T9, Washburn talks about regulator noise. He does not explain what troubles it causes. What is this problem?"

A voltage regulator can be likened to a wide band white noise source. A white noise source is one that emits a broad spectrum of noise (and you can measure this with a signal strength meter or a spectrum analyzer as for real-world-level) which is quite constant in amplitude. Now this was not what a voltage regulator was designed to do and in fact only some do it; even **only some** of a particular device number may do it while others are 'not noisy'.

When a voltage regulator that thinks it is a noise generating (diode) device creates noise, this noise generated source sends the noise through the DC circuits where it mixes with the video. The effect is to have a noisy video amp or a noisy video anything. Obviously one of the last things you want to mix with video in a video amp in a TVRO receiver, after you have fought all the way from 4 GHz to eliminate or suppress noise is 'baseband noise'. Washburn discovered as



PARKING LOT FULL - antennas were spread throughout facility [22 in all!]; here Hamilton Satellite Systems [front] plus several H & R [Starview] 16 and 10 footers [behind] scan the skies.

he was fighting a noisy picture that a small percentage (perhaps 10%) of the particular regulators he was using were 'noisy'. He felt that if he bought some regulators that were closet-noise-generators that others may have also been just as unfortunate. The problem is not unique to his receiver; anyone using this family of voltage regulators with any receiver can have it.

"It is no good to me to read that 'Spisar reports he is obtaining improved S/N performance with his discriminator that he can obtain with a PLL demod'; what does that mean? Improved in what way? How about some direct comparisons, side by side, between Coleman's single conversion active mixer, Tay Howard's receiver, a Microdyne, an ICM, a Washburn and so on? Tell us which one is best!"

Best for what? For whom, under what specific conditions? Regardless of price? Regardless of antenna size? Regardless of LNA noise figure? Regardless of transponder transmission parameters?

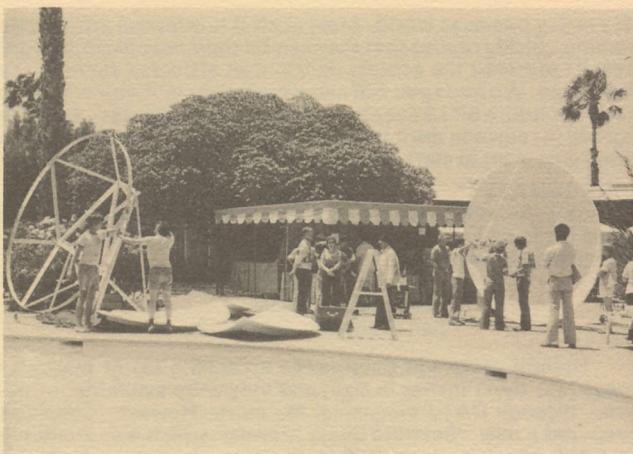
If there was one **single** best for all seasons, all conditions, we'd tell you. There is no such animal. Coleman's single conversion works much **better** than the pro's think it should. Tay Howard's receiver gets **better** all of the time; which says he keeps improving it's performance while trying to whittle down the cost of building it. A Microdyne receiver is a **superb** running commercial radio and it costs like one of its class should (or at least like the rest of the CATV/commercial units do). ICM's are the **best** selling private terminal radios today. The Washburn receiver was tested by a CATV commercial type firm where it outdid (in S/N performance) all but one of the high-dollar (over \$3,000) radios; and that one it tied.

There was a side by side test of sorts at SPTS in Miami during the BrasilSat reception. An AVCOM, an ICM, an A-B Electronics and Paul Shuch's 1980 version prototype all were compared on the one-half transponder Brazilian reception. The new Shuch prototype was clearly best by perhaps 1.5 to 2.0 dB S/N. Does that make Paul the best receiver designer? Not at all. The clue here is 'half transponder' which means deviation is limited on the downlink signal to a maximum of around 17 MHz. When the deviation is cut back, a phase lock loop demod can handle it better than a conventional discriminator such as the AVCOM uses. A PLL is inherently a bandwidth limiting demod; it actually adjusts itself to the video bandwidth present. That's why Steve Birkill has been so successful in England recovering INTELSAT feeds with his small 8 foot dish. His PLL adjusts (and is further tweaked into adjustment by Steve) to recover less than a full bandwidth. In Steve's case he adjusts it down as tight as 4 or 5 MHz bandwidth but in so doing he loses definition (i.e. resolution) except when they are transmitting a static pattern that is not widely deviated.

"Can the Birkill hybrid mode feed be installed on a rotor to recover both polarizations?"



REMOTE CONTROLLED - Microwave General 16 footer had on-trailer plus in-booth remote controls for antenna positioning.



ACROSS THE POOL - STAR 13 footer [left] starts going together while on the right the ADM folks have their 11 footer ready for the LNA.

It could.

"How come the Howard receiver doesn't use any ferrite beads and feed thru capacitors while the Washburn uses both and the Washburn had channel 4 TV blocking while the Howard had none at Miami?"

Taylor Howard shields everything he builds pretty well; Washburn opted for more open construction. A piece of tin or copper as shielding is always a good idea even when you also use ferrite beads as RF chokes and feedthru capacitors to block RF.

"In the Spisar article in the April CSD [page T2] he mentioned using a single downconverter to get 3.7 - 4.2 GHz down to a single high IF [say 500 - 1,000 MHz] and then using multiple second conversion systems to selectively take one channel at a time out of that high IF on down to 70 MHz and demodulation. I read an article in Communications News magazine authored by one of the fellows from Avantek who appeared in Miami discussing exactly this. Why isn't this a good idea?"

It is, but it is not new. A chap named Steve Richey developed this approach back in the summer of 1978 for a firm called SATCO. This firm folded up about a year ago although perhaps 50 CATV type TVRO receivers were built and shipped utilizing this approach. More recently Hughes Microwave has come out with a similar package. It works this way. The 3.7 - 4.2 GHz signal is downconverted to the high IF. The whole 500 MHz range is present in the wideband high IF. Then individual second conversion downconverters select the appropriate 36 MHz wide portion of the high IF where the desired transponder channel is 'resting' and carry it on down to 70 MHz and demodulation to video and audio.

The advantage to this system is that you could stack up to 12 separate channels (one for each transponder) of demodulators after a single 3.7 - 4.2 GHz to high IF downconverter. If you are a CATV system taking multiple channels off of the bird simultaneously, this begins to make sense since a single high IF to demod box costs less than a full 3.7 - 4.2 GHz to baseband box.

The disadvantage to this is that if you lose one downconverter you lose service on all of the satellite channels since you only have one downconverter! Like we said earlier, there is no 'one-best' system in anything.

"I don't understand why some receiver designs have AGC while others do not. Do you need it? If not, why do some include it?"

Automatic gain control is only required when you have some stages in the receiver which are operating close to their maximum output capabilities with 'normal' inputs. Every active device (i.e. transistor) has an 'overload point'. That is, when you sum (add) the input voltage to the device with the gain (in dB) of the device, you must then determine if these two numbers added together will exceed the rated output



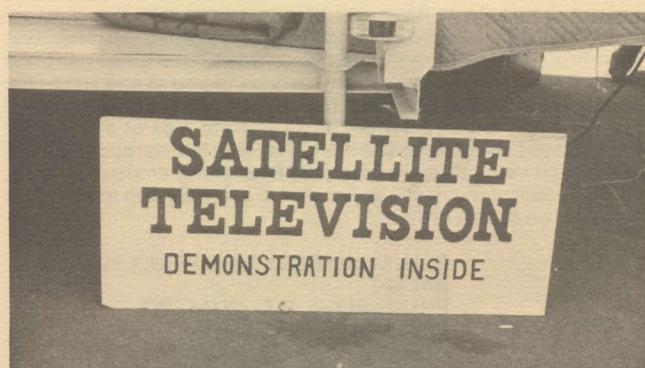
MICROWAVE GENERAL's 16 foot trailer mounted rig featured their low-profile mount; behind, the Hubbard-Payne dish.

capability for the device. If it is close but on the low side, you get concerned that somebody may use a 'hot LNA' or a 'big dish' ahead of the device, producing more input signal than was considered 'normal'. If this 'hot' input signal pushes the output of the device in question beyond its rated output (level) capabilities, the device may saturate (i.e. shut down), it may overload (i.e. produce distortion products) or it may start generating inter-mod (products created by the sum and difference of the various carriers present in the device). Any of these will cause the system to go into convulsions.

Some receiver designers choose to run their devices far enough below the output rating capabilities of any single stage that they know that no realistic combination of LNA gain plus antenna size is going to produce too big an input for any of the stages in the receiver system. Other designers choose to run some of their active devices in the 'upper portion' of their operational curves because often this is where the best operating characteristics are found. The danger in this is that the device can be overloaded and they therefore plan for this possibility by creating an AGC system that 'servos' backward in the receiver to cut the gain down in case there is an increase in the receiver input (RF) voltage levels.

Most of the commercial receivers AGC only in their video amp stages to insure that they maintain a flat 1 volt peak to peak baseband video output although a few do AGC in the RF portions (typically in the IFs) as well. Again, each design engineer has his own approach and if only one approach was best then that would be the one used by everyone.

As in all things in life, there are designing trade offs that must be considered with any approach to TVRO receiver design. A little bit of knowledge, as they say, is dangerous. Too much knowledge is perplexing sometimes!



SAYS IT ALL. Boy did we demonstrate!

PROGRAMMING CORRESPONDENCE

RCA ALASCOM NOTES

I would like to thank the Coopers for putting on the SPTS '80 San Jose Seminar. I found it a most worthwhile trip and very educational. The exhibits were great and the sessions outstanding. I especially liked meeting the people who design the equipment because it makes mail order transactions more personal. You did a great job of arranging everything and the San Jose Hyatt was a fine facility.

Here are some notes, from my Alaska based observations, concerning the present program feeds to Alaska on transponder 23, RCA SATCOM FII. All programs uplinked from New York City (via Vernon Valley) are carried with a standard 6.8 MHz aural sub-carrier. All programs uplinked from Los Angeles will have the audio on a 5.8 MHz sub-carrier whether the video signal is dual or single format (two video signals are transmitted in the half-transponder format). All programs uplinked from Anchorage will have the audio on 5.8 MHz. A SCPC signal with the same audio will also be used on transponder 3 with both the Los Angeles feeds and the Anchorage feeds to accomodate the older Bush Terminal sites which started off with a program audio system utilizing a transponder 3 SCPC channel. And just for the record, should SATCOM FII fail or go crazy (as it did once last fall) the backup satellite designated is ANIK III located at 114 degrees west.

Paul M. Yoshimi
Alascom Yakutat Earth Station
Yukatat, AK 99689

Thank you for the additional information Paul; and thank you [!] for coming to San Jose.

LIKED SPTS '80 SAN JOSE

After twenty eight years as a communications technician in Canada I can only say that I have never enjoyed a business seminar as much as I enjoyed SPTS in San Jose! Thank you very much; as usual it proves once more that we Canadians are indeed fortunate to have you as our neighbors. The warmth and friendship extended to me, a comparative no one, was beautiful. Each and every exhibitor was above all patient and indeed helpful. If I can be of any service to you at any time, you need only ask. You and your friends are remarkable people. I only wish Dr. Miesell of our CRTC and Mr. Fox of our federal government could have attended. I for one will spread the word and in that vein please list me in **CSD** as being anxious to share satellite technology with any and all in my area who might work together on such a project.

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Canada (604-465-6835)

Thank you for attending! SPTS works very well because it has a spirit one seldom finds anymore; an openness and real world flavor which for some reason we seem to have lost in the

day to day business world. Most of all it is informal and people coming quickly realize that they can let their hair down and get heavily involved the subject matter that attracted them in the first place. We hope you will come back and we'll do our best to keep the future SPTS events at the same pace. Oh yes - we have agreed to return to the San Jose Hyatt July 3, 4, and 5 in 1981 so those who want to start planning now have a date to shoot for!

EIRP CHARTS

Can you tell me where I can locate a set of EIRP footprint maps (11 in all I believe) showing the dBw signal contours for the various satellites?

Howard Goodyear
San Francisco, CA 94112

Several years ago Coop made up such a set of two-color maps [8 1/2 by 11 inches in size] and they were available, at the time, through CATJ magazine. No more. However Coop has prepared a new 'Satellite Users Manual' which was available at SPTS '80/San Jose and it contains the latest footprint data for each bird of interest to us here. Footprint maps have appeared in past issues of CSD as well, and four representative footprint maps appear on the back of our popular Worldwide Communications Satellites wallchart.

ACTIVE IN INDIA

We would be grateful if you could send us the publications 'Coleman TD-2 Manual', 'Howard Terminal Manual', 'Swan Spherical TVRO Antenna Manual' and 'Satellite Study Package' for our library.

N. K Sharma
Space Applications Centre
Government of India
Jodhpur Tekra
Ahmedabad, India

It's a deal if you will keep us advised of the development of the Indian Domestic bird system now under construction!

BIRD OPERATIONAL NOTES

New Russian Ghorizont bird (IV) at 14 west became active late in June; replacing ailing II bird previously in operation there. Outstanding +31/32 dBw Global beam carries five active TV transponders; details in September **CSD**.

Molniya reception has now been 'proven' on both coasts, Canada and Mexico. Next challenge!

VERY heavy use of Westar 3, COMSTAR D-2, Westar I plus limited use of Westar 2 and Satcom I during GOP convention had individual stations (more than 60) now equipped with earth stations in US feeding live reports via satellite. Many stations shared local PBS terminals (on Westar I) for receipt of their live 'via satellite' convention feeds. Economy of satellite made possible local flavor for coverage by individual state delegations. Much of this will repeat for Democratic convention.

Electronics trade press coverage of SPTS concentrated on pricing of hardware, large number of potential and actual

dealers and distributors on hand, and development of SPACE group program.

EXPANSION of cable services to COMSTAR D-2 and Westar III now seems certain. Major programmer supporting Westar is Satellite Syndicated Systems which operates SPN on transponder 21 of FI. They are offering actual package of ten foot dish plus Amplica 100 degree K LNA to legitimate cable systems for \$2500 (system supplies receiver). Satellite Communications Network meanwhile is pushing larger (5 meter) terminals to cable firms for COMSTAR D-2 feed of SCN Las Vegas Entertainment Network due to begin service in September. Both programmers realize that if they are going to get big viewers for their programs (and therefore dollars for programming) they are going to have to provide hardware at cost or 'free' in some instances. Effect on TVRO hardware business may be tightening of supply of LNAs, some receivers and smaller dishes for the next six months to a year; from 'commercial' (i.e. cable) vendors.

RCA reportedly studying feasibility of building, launching and operating a 12 GHz direct broadcast satellite (DBS). NAB meanwhile continues war of words against DBS concept zeroing in on regional or national nature of DBS service and arguing that if DBS is allowed to operate 'local station' service will suffer; may even disappear.

UN meeting of Committee on Peaceful Uses of Outer Space made no real progress during July meeting. Group was even unable to agree on site for next meeting. Bulgarian delegate set tone by urging group to adopt policy that propaganda broadcasts from satellites "especially those broadcasts that incite hatred" should be banned. Soviet position urged that 'sovereignty of states must be protected by agreement'.

OTHER DBS news: COMSAT now says it will file DBS plan with FCC by September or October. NTIA (5285 Port Royal Rd., Springfield, VA 22161) has issued study of potential interference between DBS system (12.2 to 12.7 GHz) and existing / planned terrestrial services; \$6 and number is PB-80-157423. DBS as subject has been added to agenda of Public Service Satellite Consortium meeting this fall. Japanese DBS experimental satellite (BSE) quit in June after failure of third (of three) traveling wave tube amplifiers. Japan had planned experiment for another year or more but premature failure of TWTs indicates flight rating of 200 watt TWTs is still far ahead. PBS decided to **cancel** plans of direct satellite feeds to translators.

RCA got clean bill of health from FCC over squabbles involving RCA assignment of transponders. Litigants (SIN, others) may now try court appeals.

Winegard Industries Robert Fleming reports this major TV equipment supplier plans to be in home terminal business by October; representatives from Winegard including firm founder John Winegard were in attendance at San Jose.



ANTENNAS - as far as the eye can see. And this was but one of three antenna areas set up!

Satellite Program Network feed on Westar III (transponder 9) actually began before July 18th formal start date; Westar IV due to launch in 1982 will have 24 transponders (as does SATCOM and COMSTAR now) and SPN/SSS President Ed Taylor believes by the effective date of IV-use cable growth will be so substantial that majority of IV transponders will then be dedicated to cable programming services.

Don't get too hooked on San Francisco/Oakland KTVU (transponder 1 on FI); it will leave its 'super station' status on January 1, 1981 as the Warner Amex carrier replaces it with Nickelodeon (now on 11). Warner's **The Movie Channel** service will then expand to 5 and 11 with 5 utilized for west coast and 11 for east coast. The Movie Channel has been hampered outside of Warner owned systems where mandatory carriage applies because the 24 hour service brings up R rated movies at times many cable systems do not deem appropriate. By switching to a pair of transponders (one east, one west) The Movie Channel finally admits it wants to compete with HBO and Showtime.

White House ('the' White House) installing private terminal so President Carter can have direct access to Cable News Network and other services not available in DC. Ronald Reagan would probably like it there also; he can keep tabs on his old movies on WOR and WGN that way!

Westar III to be home for new AP Dataphoto service to newspapers; this is in addition to present leased line service where same end result is called Laserphoto.

Whether ARABSAT will ever get off ground continues to be a big question; consortium of 22 mideastern nations asked for bids on system and received only 1 taker. Group decided that wasn't enough to 'choose from'.

FCC and RCA under pressure over use of 132 degree orbit spot everyone has assumed would be home for SATCOM III replacement; due for late 1981 launch and operations. This Clarke orbit spot is considered 'prime' because from it all of US and North America can be 'seen'. FCC originally wanted to give RCA another shot at slot after loss of III last December; still believes RCA should have chance to fill it. Other competitors would like to convince FCC RCA **had** a shot at it and blew it; and **they want** FCC to reopen slot to first-get there, first to have it free for all.

Exact transponder line up (and exact birds to be used) by controversial Premiere package (see **CSD** for June, page P9) remains up in air. No firm announcements likely until mid-fall.

FCC approved Ted Turner's sale of North Carolina UHF station (\$20M) and cable industry group of investors added \$10M to help bankroll of Cable News Network. Turner has everything on line with this one.

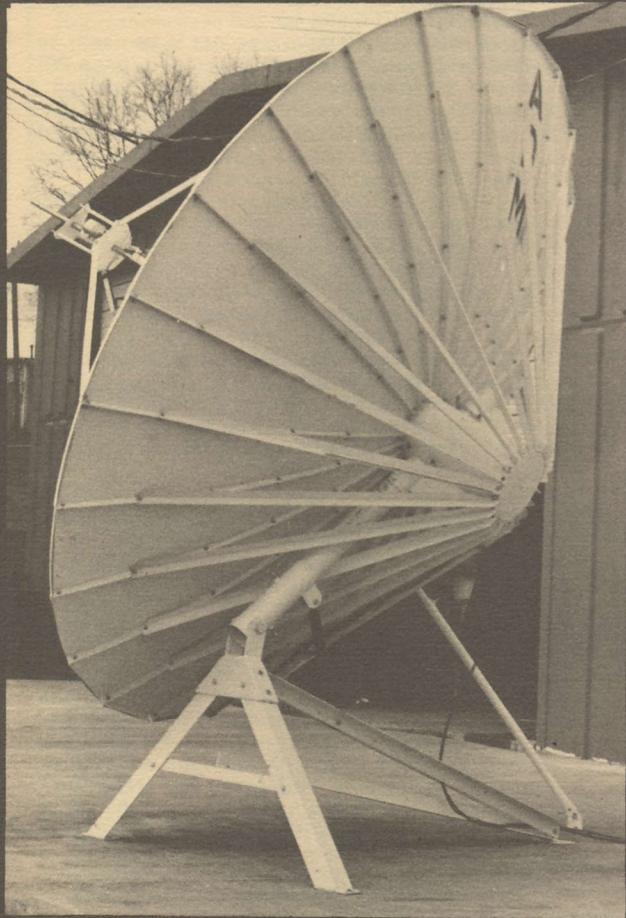
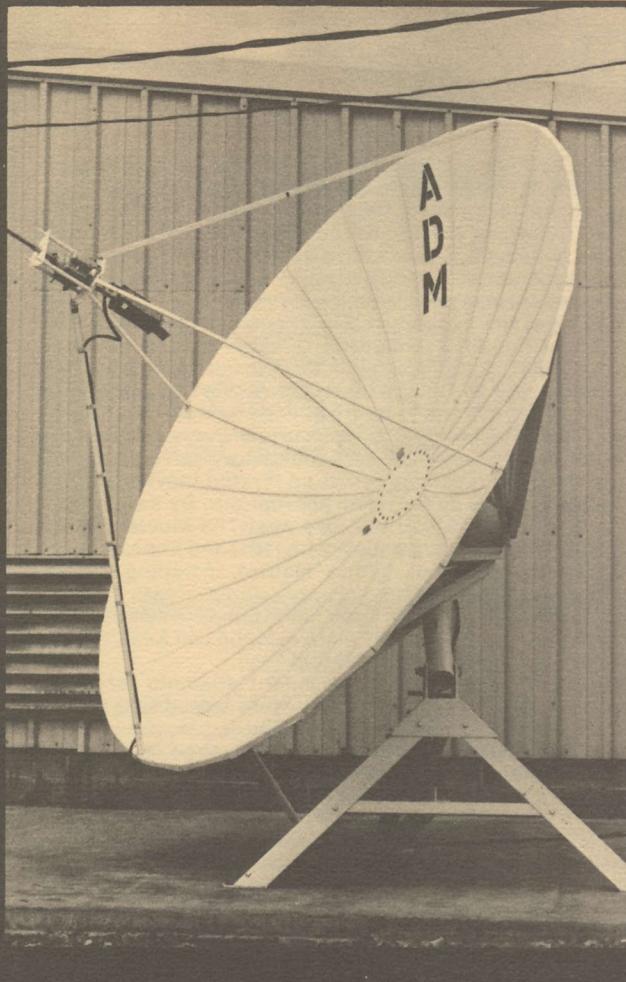
Television stations not equipped with TVRO facilities during GOP gathering in Detroit were paying high bucks for access to a satellite feed. Examples: One station bought \$3200 tuneable receiver for local PBS outlet to get use of PBS terminal for perhaps half dozen feeds. Another station was paying \$400 per use and used terminal 3 times per day for five days. Anyone with trailer mounted terminal capable of quality reception from WESTAR birds could probably pay for trailer in a week by renting it to local TV outlet.

AUSTRALIAN direct to home service appears mired in studies. Recent COMSAT award of \$200,000 for study of program is latest. Word from **inside** Australia tells us Australia will opt for 4 GHz rather than 12 GHz service.

INDIANAPOLIS area CATV operator Omega Communications installing \$30,000 apartment house systems interfacing with existing MATV systems.

ESPN carrying 43 Canadian football league games; USA Network (formerly Madison Square Garden Events) now carrying professional soccer (transponder 9) Wednesday evenings. HBO Cinemax scheduled to begin 24 hour per day service transponder 20, 23 August 1st.

RCA back demonstrating and testing STRAP (simultaneous transmission of two video baseband signals on one transponder through interleaving of alternate lines of picture) and now professes system will be used in **international** transmissions (via INTELSAT) of programming for Armed Forces overseas. If system is employed for INTELSAT transmissions, use of US programming overseas will be out of reach of virtually all lower cost terminals since present generation of STRAP decoders are in \$20,000 region.



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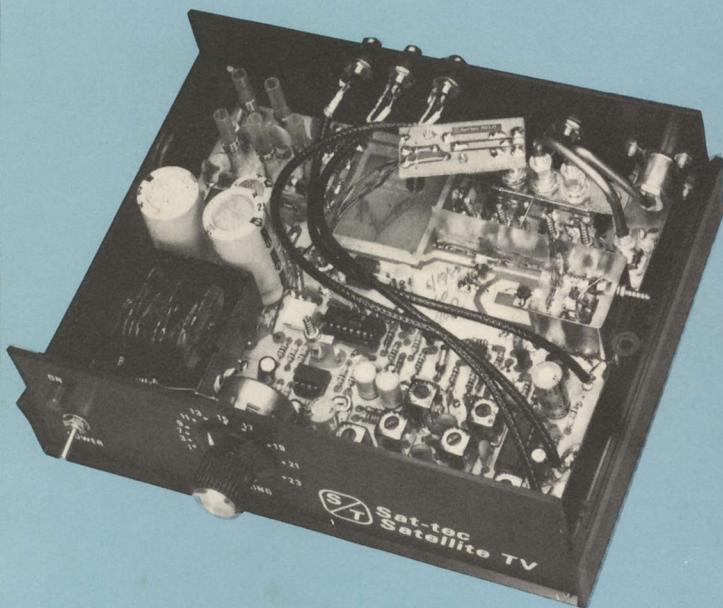
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A TV Satellite Receiver with all the features you need, at a price you can afford.



The Sat-tec R2 receiver is a versatile, consumer oriented unit designed for volume production. Easy operation and a clear, simple format makes the R2 idea for any application where non-technical users are involved. Fully frequency agile, the R2 may be used on 12 or 24 transponder birds, and since the tuning is continuous, foreign satellites such as Intelsat and Molniya can be received. A high performance AFC keeps the tuning accurate and sharp, fine tuning is not necessary. Standard one-volt P-P outputs for both audio subcarriers as well as video interface easily to any VTR or use the optional BC-1 modulator for direct TV set hook-up.

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Frequency Range: 3.5 - 4.5 GHz

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Audio Subcarriers: 6.2 and 6.8 MHz standard, others available.

LNA Power: 15 volt at 150 Ma LNA Supply built-in.

Power Required: 110 VAC at 15 watts 50/60 Hz, 220 volt available.

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